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CONTENTS

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CORRECTIONS

November 1930, vol. 67, page 427: Table 3, top line, the entries for Akron, Ohio, should be discarded since a re-check of the observations discloses that owing to a slow leak in the balloon, during the 25th or 26th minute of ascent, erroneous values were obtained.

December 1930, vol. 67, page 439: 2d column, 2d line, "σ_1" should be "ρ_1"; page 442: 1st column, 2d paragraph, in the equation the dash after R_m should be an equality *sign*; just below, in the heading to the last column of table 10, "K¹" should be simply "K"; page 443; table 12, the mean for the 2d column, "—.1" should be "—1.1".

Monthly Weather Review Supplement No. 42: Page 88, table 30, the elevation at 21:48½ on December 2, 1934, should be "4,125 ft." instead of "14,125"; pages 88 to middle of page 101, the year "1930", in the left-hand column should be "1934".

MONTHLY WEATHER REVIEW

Editor, EDGAR W. WOOLARD

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ONE BASE MAP IN PLACE OF FIVE

By B. J. S. CAHILL

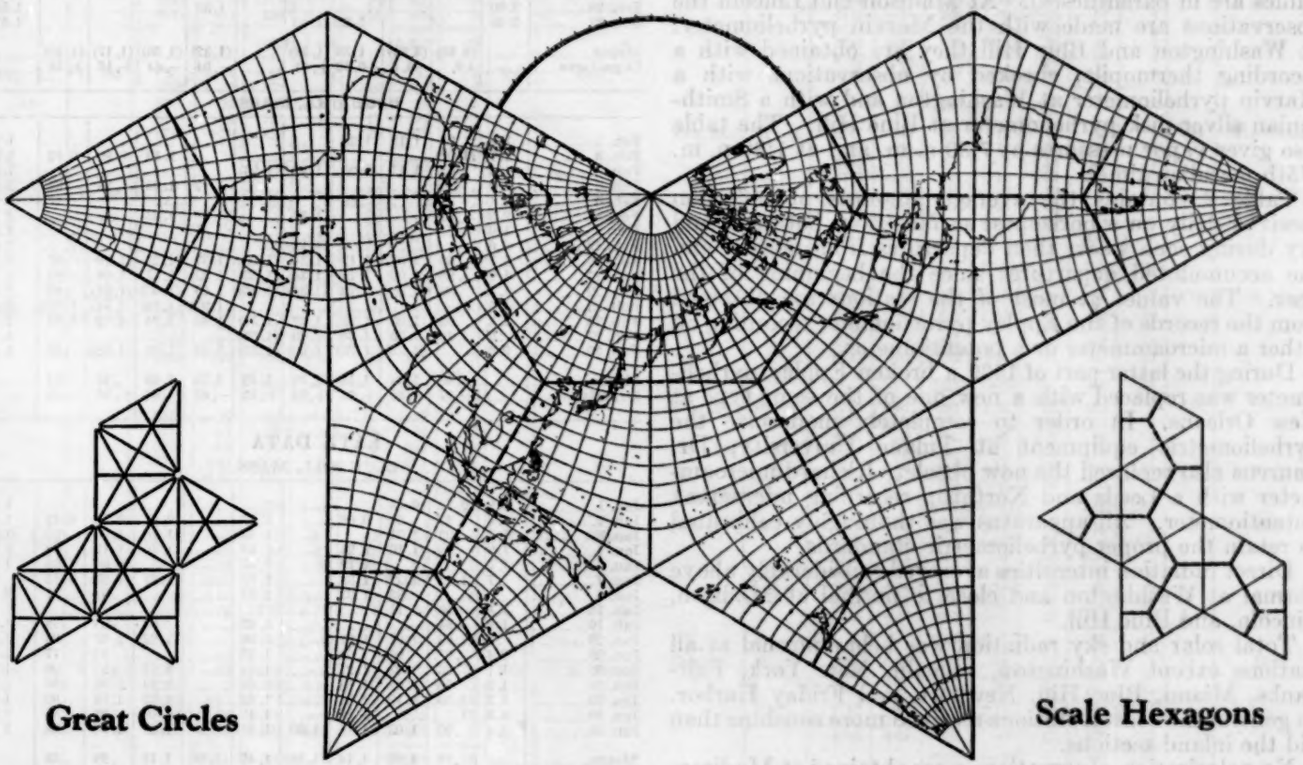
[Alameda, Calif., January 1940]

In the April 1929 issue of the MONTHLY WEATHER REVIEW, the writer showed how all synoptic charts to serve the needs of agriculture could be cut from the conformal variant of his "Butterfly Map," and after entry of data be reassembled into weather maps of the whole world; on page 132 was a map of the North Atlantic on this octahedral projection prepared in Copenhagen.

This suggestion was later overruled in favor of the five-map idea suggested in 1910, adopted later by the International Commission and again adopted in 1937 at Salzburg.

It appears to the writer, however, that for obvious and compelling reasons the one-map idea must win out in the end. In the first place, since 1929, the rapid progress in radio broadcasting has made weather reports promptly available from every ship at sea for the use of every station on land. In the second place, since 1929, the great development of aviation, notably over the Pacific, has created a demand for a weather survey on one synoptic chart, not only from the North Pole to the Equator as on the map proposed in Copenhagen, but from Pole to Pole across the Equator. A third advantage of the one map, not emphasized in 1929 because not then realized, is that distances between any two points on the globe can be accurately determined exactly as shown on all Great Circle sailing diagrams; not one of these sailing diagrams includes such flying routes as that between Berlin and Lima, or between London and Port Darwin, whereas on the octahedral system such comparisons are easily made graphically.

To summarize: since 1929, aeronautical meteorology has become coordinate in importance with the older fields of applied meteorology, and requires one continuous chart; the writer contends that the one-map system is demonstrably better for all applications, and logically should dominate. In the interests of unity and standardization along scientific lines so all-important to the future of meteorology, he emphatically urges that the present ruling in favor of five base maps be reversed in favor of one. This action may not be easy, any more than the problem of designing an adequate base map was easy, but it should not be impossible.



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By AMY P. LESHER

(This section will be resumed soon—Editor)

SOLAR OBSERVATIONS

[Meteorological Research Division, EDGAR W. WOOLARD in charge]

SOLAR RADIATION OBSERVATIONS, FEBRUARY, 1940

By IRVING F. HAND

Measurements of solar radiant energy received at the surface of the earth are made at nine stations maintained by the Weather Bureau, and at ten cooperating stations maintained by other institutions. The intensity of the total radiation from sun and sky on a horizontal surface is continuously recorded (from sunrise to sunset) at all these stations by self-registering instruments; pyrheliometric measurements of the intensity of direct solar radiation at normal incidence are made at frequent intervals on clear days at three Weather Bureau stations (Washington, D. C., Madison, Wis., Lincoln, Nebr.) and at the Blue Hill Observatory at Harvard University. Occasional observations of sky polarization are taken at the Weather Bureau stations at Washington and Madison.

The geographic coordinates of the stations, and descriptions of the instrumental equipment, station exposures, and methods of observation, together with summaries of the data, obtained up to the end of 1936, will be found in the MONTHLY WEATHER REVIEW, December 1937, pp. 415 to 441; further descriptions of instruments and methods are given in Weather Bureau Circular Q.

Table 1 contains the measurements of the intensity of direct solar radiation at normal incidence, with means and their departures from normal (means based on less than 3 values are in parentheses). At Madison and Lincoln the observations are made with the Marvin pyrheliometer; at Washington and Blue Hill they are obtained with a recording thermopile, checked by observations with a Marvin pyrheliometer at Washington and with a Smithsonian silver disk pyrheliometer at Blue Hill. The table also gives vapor pressures at 7:30 a. m. and at 1:30 p. m. (75th meridian time).

Table 2 contains the average amounts of radiation received daily on a horizontal surface from both sun and sky during each week, then departures from normal and the accumulated departures since the beginning of the year. The values at most of the stations are obtained from the records of the Eppley pyrheliometer recording on either a microammeter or a potentiometer.

During the latter part of 1939 a broken Eppley pyrheliometer was replaced with a new one of the same type at New Orleans. In order to completely modernize the pyrheliometric equipment at Tulane University, Dr. Laurens also replaced the now obsolete Richard microammeter with a Leeds and Northrup recording microamax potentiometer. All apparatus was thoroughly calibrated to retain the proper pyrheliometric standards.

Direct radiation intensities averaged considerably above normal at Washington and close to normal at Madison, Lincoln, and Blue Hill.

Total solar and sky radiation was below normal at all stations except Washington, Lincoln, New York, Fairbanks, Miami, Blue Hill, Newport, and Friday Harbor. In general the coastal stations received more sunshine than did the inland sections.

No polarization observations were obtained at Madison, owing to continual snow and ice cover.

TABLE 1.—*Solar radiation intensities during February 1940*

[Gram-calories per minute per square centimeter of normal surface]

WASHINGTON, D. C.

Date	Sun's zenith distance: 7:30 a. m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p. m.
	75th mer. time	Air mass: A. M.				P. M.					Local mean solar time
	e	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Feb. 3	1.78				1.58						2.16
Feb. 15	1.52				1.55						1.52
Feb. 16	1.52		1.14	1.29	1.44						1.45
Feb. 26	1.32		1.22	1.38	1.58						1.32
Means			(1.18)	(1.34)	1.54						
Departures			+.25	+.33	+.33						
MADISON, WIS.											
Feb. 2	1.19			1.19	1.45	1.78					2.16
Feb. 7	2.26			1.13	1.39	1.71					2.49
Feb. 13	1.45				1.40						2.26
Means				(1.16)	1.41	(1.74)					
Departures				−.04	+.04						
LINCOLN, NEBR.											
Feb. 9	0.74							1.20	1.17	1.10	1.32
Feb. 10	1.07	0.93	0.99	1.08							1.96
Feb. 21	1.88				1.37						3.00
Feb. 26	3.00						1.32				1.88
Feb. 27	2.49			1.22	1.40						4.57
Means		(0.93)	(0.99)	1.30	(1.38)		(1.32)	(1.20)	(1.17)	(1.10)	
Departures		±0.	−0.4	+0.13	+.01		−.04	−.04	+.15	+.18	
BLUE HILL, MASS.											
Feb. 1	1.3	1.04	1.13	1.23							1.7
Feb. 3	1.1	(1.02)						1.19	0.90	0.82	1.7
Feb. 4	1.4	1.05	1.13	1.26	1.40	(1.56)					1.5
Feb. 5	1.9						1.12	1.00	.83	.67	2.2
Feb. 6	2.1			.88							3.2
Feb. 8	2.3	.99			1.37		1.30	1.03			2.5
Feb. 9	3.0						(1.35)				1.8
Feb. 12	2.6				(1.22)						3.8
Feb. 16	1.7	.98	1.07	1.17	1.34	(1.50)	1.37	1.22	1.10	.97	2.2
Feb. 17	1.9	.96	1.06	1.19	1.36	(1.53)	1.33	1.17	1.01	.96	3.0
Feb. 22	1.3	.88	1.00	1.12	(1.34)	(1.46)	1.23	(1.05)	(.94)	.83	2.3
Feb. 23	1.5						(.97)	(.85)	(.74)	(.65)	2.4
Feb. 26	1.3	.99	1.09	1.21	1.37	(1.54)	1.40	1.24	1.12	1.03	1.1
Feb. 27	.9	1.10	1.20	1.30	1.40	(1.53)					1.1
Feb. 29	2.0		(.65)	(.78)	(.99)	(1.33)	1.24	1.05	(.88)	.80	1.9
Means		1.06	1.04	1.13	1.31	1.49	1.26	1.09	.94	.84	
Departures		+.07	−.01	+.03	+.02	+.03	−.02	−.06	−.09	−.10	

LATE DATA

BLUE HILL, MASS.

Jan. 1	0.8	0.72	0.85								1.5
Jan. 2	1.5	.47	.54	0.68		1.07		0.67	0.53	0.42	1.6
Jan. 3	1.7	.93	1.04			1.46		1.16	1.06	.95	1.9
Jan. 4	1.9	.99	1.10	1.24		1.58		1.26	1.12	.99	1.5
Jan. 6	1.5			1.12		1.37			1.04	.93	1.5
Jan. 7	.7	1.13	1.22	1.33		1.57		1.32	1.22	1.13	.6
Jan. 9			.95	1.07		1.52			.91	.77	2.0
Jan. 16	1.3	.98	1.11								1.1
Jan. 19	1.8	.54				1.47		1.02	.85	.73	1.3
Jan. 23	.7	.93	1.07	1.22		1.59		1.22	1.07	.98	1.0
Jan. 25	2.4	.87	.96	1.05		1.25			.86	.77	1.8
Jan. 27	1.1	.93	1.03	1.21		1.49		1.12	.95	.90	1.4
Jan. 28	1.3	.95	1.04	1.18		1.48		1.19	1.05	.94	1.5
Jan. 29	1.3	1.03	1.12	1.24		1.52		1.22	1.09	.99	1.4
Jan. 30	1.3			1.21		1.45		1.10	.98	.86	1.3
Jan. 31	1.4	.92	1.03	1.15	1.30	1.46	1.30	1.19	1.08	.98	1.7
Means		.98	1.00	1.14	(1.30)	1.45	(1.30)	1.13	.99	.88	
Departures		.02	0	+.04	+.01	−.01	+.02	−.03	−.05	−.08	

* Extrapolated.

TABLE 2.—*Average daily totals of solar radiation (direct+diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Week beginning—	Washington	Madison	Lincoln	Chicago	New York	Fresno	Albuquerque	Fairbanks	Twin Falls	La Jolla	Miami	New Orleans	Riverside	Blue Hill	Newport	Friday Harbor	Cambridge
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Jan. 29	253	152	191	79	217	140	308	37	172	210	412	308	156	265	254	145	240
Feb. 5	197	192	225	93	116	292	411	48	165	351	341	194	352	191	171	87	180
Feb. 12	249	230	220	141	229	308	422	101	175	367	408	148	360	272	272	148	271
Feb. 19	265	255	233	189	235	238	405	122	227	287	414	272	277	235	200	206	202
DEPARTURES FROM WEEKLY NORMALS																	
Jan. 29	+51	−33	−31	−38	+62	−48	.....	−8	−18	−48	+68	+78	−71	+46	+48	+41	.....
Feb. 5	−15	−10	−34	−43	−44	+28	.....	−14	−36	+45	−3	−30	+64	−37	−54	−23	.....
Feb. 12	+24	+6	−48	−6	+52	+18	.....	+18	−84	+65	+59	+93	+45	+34	+28	+13	.....
Feb. 19	+10	+3	−63	+12	+36	−14	.....	+18	−27	−79	+48	−11	−58	−26	−55	+52	.....
ACCUMULATED DEPARTURES ON FEB. 25, 1940																	
	+1,148	+427	−679	+448	+1,274	−833	.....	+133	−2,247	−1,064	+1,708	+441	−2,128	+805	+203	+679	.....

POSITIONS AND AREAS OF SUN SPOTS

Communicated by Capt. J. F. Hellweg, U. S. Navy (Ret.) Superintendent, U. S. Naval Observatory. Data from measurements at the U. S. Naval Observatory from plates obtained at the observatories indicated. Difference in longitude is measured from the central meridian, positive toward the west. Latitude is positive toward the north. Areas are corrected for foreshortening and expressed in millionths of Sun's hemisphere. For each day below longitude, latitude, area of spot or groups, and spot count, are given respectively the assumed longitude of the center of the disk, assumed latitude of the center of the disk, total area of spots and groups, and total spot count]

Date	Eastern standard time	Mount Wilson group no.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Spot or group	Spot count	Plate quality	Observatory
1940	*h m*		°	°	°	°				
Feb. 1	10 34	6743	−56	67	−24	57	24	5	VG	U. S. Naval.
		6742	−50	73	−7	49	242	3		
		6743	−49	74	−24	19	73	2		
		(*)	−38	85	+12	42	48	2		
		6741	−9	114	+12	20	485	12		
		6741	+7	130	+11	18	679	5		
				(123)	(−6)		1,551	29		
Feb. 2	11 45	(*)	−44	65	−8	43	24	5	VG	Do.
		6742	−37	72	−7	36	339	7		
		6743	−37	72	−24	40	73	5		
		6741	+4	113	+12	17	582	15		
		6741	+20	129	+11	25	679	12		
				(109)	(−6)		1,697	44		
Feb. 3	10 32	(*)	−30	66	−8	29	24	2	F	Do.
		6742	−23	73	−7	23	339	6		
		6743	−23	73	−23	27	73	1		
		6741	+16	112	+12	17	436	7		
		6741	+31	127	+11	35	630	4		
				(96)	(−6)		1,502	20		
Feb. 4	15 14	6743	−7	74	−23	19	97	1	F	Do.
		6742	−6	75	−7	6	339	4		
		6741	+31	112	+12	35	436	3		
		6741	+48	129	+11	50	630	3		
				(81)	(−6)		1,502	11		
Feb. 5	11 14	6744	−20	50	+6	23	24	3	G	Do.
		6743	+2	72	−24	18	97	3		
		6742	+6	76	−6	6	242	9		
		6741	+41	111	+12	45	388	3		
		6741	+60	130	+11	62	630	2		
				(70)	(−6)		1,381	20		
Feb. 6	11 28	6744	−5	51	+5	12	24	4	F	Mt. Wilson.
		(*)	+3	59	−22	17	24	8		
		6743	+16	72	−24	24	97	3		
		6742	+20	76	−5	19	388	11		
		6741	+56	112	+12	59	339	4		
		6741	+73	129	+11	75	582	2		
				(56)	(−6)		1,454	32		
Feb. 7	14 48	6746	−52	349	−9	51	73	10	VG	U. S. Naval.
		6745	−51	350	+14	56	170	12		
		6743	+31	72	−25	36	97	1		
		6742	+34	75	−6	33	315	18		
		6741	+69	110	+12	70	218	1		
				(41)	(−6)		873	42		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group no.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Spot or group	Spot count	Plate quality	Observatory
1940	*h m*		°	°	°	°				
Feb. 8	12 0	6747	−69	321	−10	68	12	7	VG	U. S. Naval.
		(*)	−58	332	−12	57	12	6		
		6746	−40	350	−8	39	36	9		
		(*)	−40	350	−5	39	24	5		
		6745	−39	351	+15	43	218	16		
		6743	+42	72	−25	44	73	1		
		6742	+45	75	−11	44	48	6		
		6742	+47	77	−7	46	182	16		
		6741	+83	113	+12	82	218	1		
				(30)	(−6)		823	67		
Feb. 9	11 22	6747	−57	320	−10	56	73	5	G	Do.
		6748	−42	335	−13	41	24	2		
		6746	−27	350	−5	26	97	4		
		6745	−20	351	+15	32	291	8		
		6743	+55	72	−25	56	48	2		
		6742	+59	76	−11	58	97	4		
		6742	+60	77	−8	59	145	7		
				(17)	(−7)		775	32		
Feb. 10	11 4	6747	−43	321	−12	42	48	9	VG	Mt. Wilson.
		6748	−29	335	−14	29	36	16		
		6746	−15	349	−5	14	48	14		
		6745	−12	352	+15	23	303	27		
		6746	−11	353	−7	10	145	28		
		6743	+70	74	−25	69	24	2		
		6742	+72	76	−10	70	48	7		
		6742	+73	77	−8	71	121	4		
				(4)	(−7)		773	107		
Feb. 11	11 36	6749	−80	271	+10	80	388	3	VG	U. S. Naval.
		6747	−28	323	−11	28	48	10		
		6748	−18	333	−13	19	24	5		
		6746	+2	353	−6	1	242	15		
		6745	+2	353	+14	21	267	12		
				(351)	(−7)		969	45		
Feb. 12	10 56	6749	−67	271	+10	68	339	3	G	Do.
		6747	−16	322	−11	16	24	3		
		6748	−3	335	−12	7	36	4		
		6748	+2	340	−12	6	12	1		
		6745	+14	352	+14	25	194	11		
		6746	+15	353	−6	50	242	12		
				(338)	(−7)		847	34		
Feb. 13	12 0	6749	−60	264	+11	62	12	1	G	Do.
		6750	−55	269	−15	55	6	1		
		6749	−53	271	+9	55	291	5		
		6747	−3	321	−11	7	48	6		
		6748	+14	338	−13	16	97	9		
		6745	+27	351	+13	32	230	14		
		6746	+28	352	−7	27	242	7		
				(324)	(−7)		926	43		
Feb. 15	11 15	6751	−58	240	−9	57	24	1	G	Do.
		6750	−30	268	−12	30	339	15		
		6749	−28	270	+9	32	291	10		
		6748	+40	338	−13	41	339	17		
		6745	+54	352	+13	57	145	6		
		6746	+58	356	−9	57	170	3		
				(298)	(−7)		1,308	52		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group no.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Spot or group	Spot count	Plate quality	Observatory
1940	h m		°	°	°	°				
Feb. 16	11 10	6750	−16	269	−12	17	291	14	G	U. S. Naval.
		6749	−13	272	+8	20	194	8		
		6748	+54	339	−13	54	436	22		
		6745	+67	352	+13	69	48	3		
		6746	+72	357	−9	71	194	1		
				(285)	(−7)		1,163	48		
Feb. 17	10 48	6750	−7	265	−13	10	194	15	G	Do.
		6749	−1	271	+9	15	145	10		
		6750	+2	274	−13	8	194	6		
		6748	+67	339	−14	66	679	17		
		6746	+86	358	−9	87	145	1		
				(272)	(−7)		1,357	49		
Feb. 18	11 40	6752	−82	176	+12	83	24	1	P	Mt. Wilson.
		6750	+8	266	−13	10	73	3		
		6749	+12	270	+9	20	48	4		
		6750	+17	275	−12	18	145	2		
		6748	+78	336	−13	77	436	6		
				(258)	(−7)		726	16		
Feb. 19	13 41	6755	−88	156	−12	88	48	1	F	Do.
		6752	−68	176	+12	70	48	5		
		6753	−8	235	−8	7	121	13		
		6750	+22	266	−13	22	48	6		
		6749	+25	269	+7	27	24	6		
		6750	+31	275	−12	31	145	3		
				(244)	(−7)		434	34		
Feb. 20	11 2	6755	−74	158	−12	74	97	4	VG	Do.
		6752	−55	177	+12	58	48	11		
		6754	−15	217	−12	15	121	26		
		6753	+7	239	−8	6	121	17		
		6749	+38	270	+7	41	24	10		
		6750	+44	276	−14	45	145	15		
				(232)	(−7)		556	83		
Feb. 21	10 54	6755	−60	159	−12	60	109	4	G	U. S. Naval.
		6752	−41	178	+12	45	48	6		
		(*)	−5	214	−24	19	12	4		
		(*)	+14	233	−15	16	12	1		
		6753	+20	239	−9	19	97	16		
		(*)	+49	268	+11	51	36	1		
		6750	+56	275	−14	56	97	1		
				(219)	(−7)		411	33		
Feb. 22	11 4	6756	−77	129	+12	80	339	1	F	Do.
		6755	−46	160	−12	46	97	3		
		6752	−27	179	+12	32	24	4		
		6754	+12	218	−11	13	170	18		
		6753	+34	240	−9	33	48	1		
		6750	+70	276	−14	70	97	1		
				(206)	(−7)		775	28		
Feb. 23	11 27	6756	−64	129	+12	66	436	1	G	Do.
		(*)	−39	154	−15	39	12	1		
		6755	−32	161	−13	32	133	3		
		6752	−15	178	+13	24	48	4		
		6754	+26	219	−11	26	97	20		
		6750	+83	276	−14	82	97	3		
				(193)	(−7)		823	32		
Feb. 24	11 22	6756	−70	109	+13	73	6	1	G	Do.
		6756	−59	120	+13	62	6	1		
		6756	−50	129	+11	53	388	1		
		6755	−18	161	−13	19	145	3		
		6752	−2	177	+13	19	24	1		
		6754	+40	219	−11	40	97	6		
				(179)	(−7)		666	13		
Feb. 25	13 9	6756	−36	129	+11	40	388	1	P	Do.
		(*)	−35	130	−15	34	24	3		
		6755	−4	161	−12	8	97	1		
		6752	+12	177	+13	23	24	1		
		6754	+55	220	−12	55	48	2		
				(165)	(−7)		581	8		

POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard time	Mount Wilson group no.	Heliographic: Difference in longitude	Heliographic: Longitude	Heliographic: Latitude	Heliographic: Distance from center of disk	Spot or group	Spot count	Plate quality	Observatory
1940	h m		°	°	°	°				
Feb. 26	13 13	6758	−66	86	−7	65	97	4	F	U. S. Naval.
		6756	−22	130	+11	27	388	1		
		6755	+10	162	−12	12	73	2		
		6752	+26	178	+12	30	24	1		
		6754	+70	222	−12	69	48	1		
				(152)	(−7)		630	9		
Feb. 27	11 30	6758	−52	88	−7	52	388	30	VG	Mt. Wilson.
		6759	−51	89	+11	53	12	3		
		6757	−30	110	−11	30	12	2		
		6756	−26	114	+18	35	48	6		
		6756	−10	130	+10	19	388	1		
		6755	+23	163	−13	23	48	2		
		6754	+83	223	−12	82	24	1		
				(140)	(−7)		920	45		
Feb. 28	13 10	6761	−63	63	−15	63	12	2	VG	U. S. Naval.
		6758	−37	89	−6	36	436	35		
		6757	−21	105	−11	21	12	1		
		6756	−12	114	+21	29	48	3		
		6756	+3	129	+10	17	388	1		
		6760	+9	135	+14	24	12	1		
		6755	+37	163	−13	37	48	1		
				(126)	(−7)		956	44		
Feb. 29	13 21	6761	−49	64	−15	49	48	5	G	Do.
		6758	−22	91	−5	21	485	30		
		6757	−7	106	−11	7	24	4		
		6756	−3	110	+10	16	48	4		
		6756	+3	116	+20	26	48	2		
		6756	+12	125	+13	23	24	1		
		6756	+17	130	+10	24	388	1		
		6762	+34	147	−8	33	97	12		
		6755	+51	164	−13	51	24	4		
				(113)	(−7)		1,186	63		

Mean daily area for 28 days = 984.

*=not numbered.
VG=very good; G=good; F=fair; P=poor.

PROVISIONAL SUNSPOT RELATIVE NUMBERS FOR FEBRUARY 1940

[Dependent alone on observations at Zurich]

[Data furnished through the courtesy of Prof. W. Brunner, Eidgen. Sternwarte, Zurich, Switzerland]

February 1940	Relative numbers	February 1940	Relative numbers	February 1940	Relative numbers
1	*b* --	11	*aad* 41	21	*a* 60
2	59	12	*Mc* --	22	*d* 59
3	58	13	62	23	44
4	52	14	*Ec* 89	24	40
5	*aa* --	15	--	25	44
6	*Ec* 47	16	73	26	*Ec* --
7	*Ec?* --	17	*aa* 51	27	52
8	64	18	49	28	*a* 46
9	*Ec* 82	19	*Mcd* --	29	*Mc* 95
10	--	20	*Mac* --		

Mean, 20 days = 58.4.

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group through the central meridian.
c=New formation of a group developing into a middle-sized or large center of activity; E, on the eastern part of the sun's disc; W, on the western part; M, in the central-circle zone.
d=Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

[Aerological Division, D. M. LITTLE in charge]

By B. FRANCIS DASHIELL

February was characterized by above-normal surface temperatures over the western half of the United States and excessive precipitation along the Pacific slope. The northerly winds and abnormal cold of January were replaced by higher temperatures generally and more southerly wind directions during the current month. In the lower levels of the upper air, the monthly mass movement of the atmosphere was somewhat unusual, changing from southerly and southwesterly winds over the Pacific coast and far Northwest to westerly and northwesterly winds over the northern and eastern sections (chart VIII). At the higher levels, as shown on charts IX, X, and XI, as well as in table 2, resultant winds were westerly and northwesterly at most pilot-balloon stations.

The current month was outstandingly wet over much of the United States, particularly in the West and over the Pacific coast. Resultant winds from the southwest quadrant occurred in the lower levels over northern California, Oregon, and Washington. These winds, together with the seasonal position of the Aleutian LOW and frequent masses of greatly modified Polar Pacific and Tropical Pacific air, were directly associated with the excess precipitation on the coastal slope that occurred throughout the month, and which condition is indicated on the isentropic chart for February (chart XII). These resultant-wind directions were oriented considerably south of the February normals, but the resultant velocities were greater than normal.

Mean upper-air pressures were highest at 5,000 feet (chart VIII) over the southern Rocky Mountains, and lowest to the northeast of the United States. High mean pressure existed over the South at all standard levels. The mean pressures for February were higher than those recorded during the preceding month in all sections east of the Divide. Northern radiosonde stations showed the greatest difference in pressure between the two months, while the southern stations were nearly identical at both periods. Gradient pressure differences between the HIGH and LOW areas (Miami, Fla., and Sault Ste. Marie, Mich., respectively) increased sharply with altitude, becoming 32 millibars at 8 kilometers, and then decreasing steadily.

High relative humidity was concentrated over the Pacific northwest at all levels above the surface. Elsewhere, the percentages of humidity were not unusual, and the lowest occurred over El Paso, Tex., in the lower levels, and over Miami, Fla.,in the upper levels.

Over the Pacific slope mean temperatures in the upper air showed that San Diego and Oakland, Calif., Medford, Oreg., Ely, Nev., and Seattle and Spokane, Wash., were not only relatively cold, but decidedly colder than in the preceding month. Fairbanks, Alaska, within the general source region of the Polar Pacific air masses above mentioned, was comparatively cold at all levels. As shown on charts VIII, IX, X, and XI, the current mean temperatures were lowest at Sault Ste. Marie, Mich.; then over Miami, Fla., at 13 kilometers and above. At 17 kilometers the lowest mean temperature recorded during the month occurred also over Miami, Fla. (−74.4° C.). The mean freezing level (0° C.) for February appeared at the surface north of a line extending approximately from northern Maryland to central Missouri, Nevada, and Montana. The level then sloped up toward the south, and reached 2,000 and 3,000 meters roughly along the thirty-fifth and thirtieth parallels, respectively, and 4,040 meters over Miami, Fla.

Except for the Pacific coast, the resultant winds at 1.5 kilometers departed from normal by turning in clockwise rotations so as to become more northerly. At 3 kilometers the winds became more southerly by counterclockwise orientations, except in the far Southwest. The 5 a. m. velocities at 1.5 and 3 kilometers were less than normal over the North and East, and greater than normal in the South and West.

The 5 p. m. winds became more southerly than morning directions at 1.5 and 3 kilometers over the southern half of the country, and assumed more northerly directions over the northern half. Afternoon velocities were generally lower than those occurring in the morning, except on the Pacific slope at 1.5 kilometers. Winds for the month were highest over the East, reaching 81.5 meters per second over Greensboro, N. C., at 11.4 kilometers, a record for that place.

MONTHLY MEAN ISENTROPIC CHART [1]

On the mean isentropic chart θ-296° (chart XII) for February 1940, it will be seen that the belt of westerlies dominates the entire country, with three moist tongues from the south skirting the southern edge of the westerlies. These three moist tongues, apparently parts of frictionally driven eddies, are associated with the abnormal precipitation over California and Nevada, central Texas and Louisiana, and Florida and the south Atlantic coast. Upslope motion and high humidities are also indicated in the far Northwest, where great excesses in precipitation occurred.

[1] Prepared by the Division of Research and Education.

TABLE 1.—*Mean free-air barometric pressure (P.) in millibars, temperature in ° C., and relative humidities (R. H.) in percent, obtained by airplanes and radiosondes during February 1940*

Stations and elevations in meters above sea level

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,620 m.)				Atlanta, Ga. (300 m.)				Billings, Mont. (1,089 m.)				Bismarck, N. Dak. (505 m.)				Boise, Idaho (824 m.)				Buffalo, N. Y. (220 m.)				Charleston, S. C. (14 m.)			
	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.
Surface	29	837	3.0	59	29	981	3.5	81	29	889	−3.9	81	29	958	−9.7	92	28	916	2.5	81	29	989	−5.2	89	29	1,015	6.2	78
500					29	957	3.8	78													29	955	−5.6	81	29	957	7.4	65
1,000					29	901	2.9	74					29	899	−8.8	91	28	901	3.5	79	29	896	−7.0	81	29	901	5.2	61
1,500					29	847	2.1	69	29	844	−2.2	75	29	843	−7.2	82	28	847	1.2	74	29	839	−8.2	80	29	847	3.7	56
2,000	29	799	3.0	57	29	795	.8	64	29	792	−3.7	73	29	790	−7.1	75	28	795	−2.3	78	29	787	−9.2	77	29	796	2.2	54
2,500	29	750	−.4	58	29	747	−1.2	59	29	743	−6.3	75	29	741	−8.7	72	28	746	−5.4	81	29	738	−11.0	74	29	748	.5	52
3,000	29	705	−3.7	59	28	701	−3.1	53	29	697	−9.7	78	29	695	−10.9	70	28	700	−8.5	81	29	691	−12.6	72	29	703	−1.9	51
4,000	29	620	−9.7	56	28	617	−8.7	48	29	611	−15.5	76	29	609	−16.7	66	27	615	−14.6	79	29	605	−17.2	68	28	619	−7.3	48
5,000	29	544	−16.4	52	28	542	−15.3	49	29	535	−22.1	74	29	532	−23.3	62	27	538	−21.4	73	28	529	−23.4	65	28	544	−13.0	49
6,000	29	475	−23.1	49	28	474	−22.5	46	29	466	−29.6	72	29	464	−30.6	61	27	469	−28.3	71	28	461	−30.4	63	28	476	−19.9	49
7,000	29	414	−30.1	47	28	413	−29.5	44	28	404	−37.5	70	29	401	−38.7	59	26	407	−36.1	66	28	399	−37.8	61	28	415	−27.3	46
8,000	29	359	−38.0	46	28	358	−36.7	43	28	348	−45.6	----	27	346	−46.4	----	26	351	−43.8	----	28	345	−45.0	----	28	360	−34.5	45
9,000	29	309	−45.7	----	28	303	−43.9	----	28	300	−52.4	----	26	297	−53.7	----	26	302	−50.2	----	27	296	−51.8	----	28	312	−41.7	----
10,000	28	266	−52.1	----	28	266	−49.9	----	26	256	−56.6	----	25	254	−59.2	----	26	259	−54.5	----	27	253	−57.3	----	26	268	−48.4	----
11,000	28	228	−55.8	----	27	228	−54.0	----	24	219	−57.9	----	25	216	−60.1	----	26	222	−56.5	----	27	216	−57.9	----	24	230	−53.6	----
12,000	28	194	−57.1	----	26	195	−56.5	----	21	187	−55.7	----	25	184	−56.6	----	25	189	−55.5	----	25	184	−56.4	----	24	197	−56.4	----
13,000	26	166	−58.3	----	24	166	−57.9	----	20	160	−53.7	----	21	157	−55.0	----	22	162	−54.7	----	21	157	−55.3	----	18	168	−57.9	----
14,000	24	141	−59.6	----	22	141	−59.5	----	16	136	−54.1	----	21	134	−55.3	----	20	138	−54.7	----	16	134	−56.1	----	18	142	−60.5	----
15,000	22	120	−62.0	----	19	120	−61.1	----	14	116	−55.2	----	17	115	−56.0	----	18	118	−55.7	----	12	114	−57.6	----	13	121	−62.6	----
16,000	19	102	−64.2	----	18	102	−63.1	----	11	99	−56.1	----	8	98	−57.4	----	14	102	−56.5	----	6	97	−58.5	----	12	103	−65.0	----
17,000	15	86	−64.9	----	12	87	−63.7	----	6	85	−56.7	----					9	86	−57.6	----					8	87	−66.5	----
18,000	9	73	−63.7	----																					5	73	−66.1	----

Stations and elevations in meters above sea level

Altitude (meters) m. s. l.	Dayton, Ohio [1] (250 m.)				Denver, Colo. (1,616 m.)				El Paso, Tex. (1,193 m.)				Ely, Nev. (1,908 m.)				Fairbanks, Alaska (153 m.)				Joliet, Ill. (178 m.)				Juneau, Alaska (49 m.)			
	Number of observations	P.	T.	R. H	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.
Surface	24	988	−1.6	82	29	835	−1.7	74	29	882	7.7	49	29	808	−1.6	82	28	994	−13.9	69	26	996	−3.4	89	28	1,006	0.2	60
500	24	957	−2.1	85													28	951	−9.7	70	26	956	−4.0	84	28	951	−1.8	61
1,000	24	899	−3.9	85													28	892	−7.5	68	26	897	−5.1	79	28	893	−4.6	60
1,500	23	843	−4.9	81					29	850	9.4	47					28	836	−8.5	67	26	842	−4.8	71	28	838	−7.0	61
2,000	23	791	−6.1	77	29	796	.2	68	29	800	6.2	46	29	798	−1.2	79	28	783	−10.7	64	26	790	−5.9	69	28	786	−9.2	62
2,500	23	742	−7.8	73	29	747	−2.0	63	29	752	3.0	44	29	750	−3.5	78	28	734	−13.4	60	26	741	−8.0	70	28	736	−11.1	60
3,000	22	695	−9.8	67	29	701	−5.0	60	29	707	−.2	44	29	703	−6.6	79	28	687	−16.5	57	26	694	−10.3	70	28	689	−14.1	57
4,000	18	610	−14.6	64	28	617	−12.0	60	29	623	−6.4	41	29	618	−12.1	75	28	600	−23.4	53	26	609	−15.6	64	28	603	−20.9	54
5,000	14	534	−19.8	62	28	541	−18.4	60	29	547	−12.7	37	29	542	−18.8	70	28	522	−30.8	51	26	532	−21.9	62	26	526	−27.9	53
6,000	9	466	−25.9	62	28	472	−25.4	59	28	479	−19.6	34	29	473	−25.9	65	28	453	−37.7	51	26	464	−28.9	60	26	457	−35.6	51
7,000					28	410	−33.4	58	28	418	−27.3	34	29	411	−33.2	64	27	391	−44.7	----	25	403	−36.3	59	26	395	−42.9	----
8,000					28	355	−41.0	----	28	363	−35.1	35	28	356	−40.7	----	27	336	−51.0	----	25	348	−43.4	----	26	340	−49.7	----
9,000					27	306	−48.3	----	28	314	−42.1	----	28	307	−48.0	----	24	287	−55.6	----	22	300	−50.0	----	25	292	−54.0	----
10,000					23	262	−53.5	----	28	270	−48.5	----	28	263	−54.2	----	21	245	−56.3	----	19	256	−55.3	----	25	250	−54.6	----
11,000					21	225	−56.5	----	27	232	−53.7	----	27	225	−58.2	----	17	210	−54.2	----	17	219	−57.1	----	21	214	−52.7	----
12,000					18	192	−55.2	----	27	198	−56.1	----	25	192	−57.4	----	16	179	−51.2	----	17	186	−56.2	----	18	184	−50.9	----
13,000					17	164	−55.4	----	27	169	−58.2	----	23	164	−57.4	----	10	153	−49.3	----	15	159	−55.3	----	15	158	−49.2	----
14,000					15	140	−55.9	----	26	144	−60.0	----	20	140	−58.0	----	9	131	−48.4	----	12	136	−55.0	----	14	136	−49.4	----
15,000					12	120	−57.5	----	25	122	−62.7	----	19	119	−59.6	----	6	113	−48.6	----	10	116	−56.0	----	9	117	−50.3	----
16,000					9	102	−59.1	----	21	104	−65.5	----	16	102	−61.0	----					8	99	−56.9	----	5	100	−50.7	----
17,000					5	87	−58.6	----	16	88	−66.1	----	9	87	−61.1	----					5	84	−57.0	----				
18,000									10	74	−65.8	----																

Stations and elevations in meters above sea level

Altitude (meters) m. s. l.	Lakehurst, N. J. [3] (39 m.)				Medford, Oreg. (401 m.)				Miami, Fla. (4 m.)				Minneapolis, Minn. (263 m.)				Nashville, Tenn. (180 m.)				Norfolk, Va. [3 4] (10 m.)				Oakland, Calif. (2 m.)			
	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.
Surface	29	1,009	−2.0	77	28	967	6.2	87	29	1,018	13.9	89	29	987	−7.3	83	29	995	2.9	81	15	1,019	2.3	75	29	1,017	11.6	83
500	29	952	−2.9	73	28	956	6.4	84	29	960	14.3	78	29	958	−6.5	81	29	956	1.9	81	15	960	2.6	69	29	958	9.6	80
1,000	29	894	−3.4	68	28	899	5.6	76	29	905	11.5	77	29	898	−7.7	80	29	899	.6	78	15	902	.8	64	29	902	7.0	77
1,500	28	838	−4.5	62	28	845	2.6	76	29	852	9.5	70	29	842	−7.8	78	29	845	−.2	71	14	847	−.8	58	29	848	4.3	75
2,000	28	787	−5.8	58	28	794	−.7	78	29	802	8.9	53	29	790	−8.3	73	29	793	−1.7	68	14	795	−2.1	50	29	798	1.9	71
2,500	28	738	−7.6	60	28	746	−3.5	77	29	755	7.3	47	29	740	−9.3	69	29	745	−3.7	65	14	747	−3.9	45	29	749	−.4	67
3,000	28	692	−9.6	61	28	700	−6.5	74	29	710	5.1	41	29	694	−11.2	65	27	699	−6.0	64	14	700	−6.2	42	29	704	−3.2	66
4,000	28	607	−14.8	60	28	615	−12.2	72	29	628	.2	31	29	608	−16.6	61	26	614	−11.0	61	13	616	−11.2	37	29	620	−9.0	63
5,000	28	531	−21.0	60	27	539	−18.7	66	29	554	−6.2	29	29	532	−23.0	57	25	539	−17.2	60	11	540	−17.3	36	29	544	−15.4	61
6,000	28	462	−27.8	64	25	471	−26.1	63	29	486	−13.0	29	27	463	−30.6	54	25	471	−23.9	58					29	475	−22.2	59
7,000	28	401	−35.4	67	23	409	−33.9	61	29	426	−19.6	30	26	402	−38.7	53	25	409	−31.3	55					29	414	−29.9	56
8,000	27	347	−42.8	----	20	354	−41.5	----	29	372	−26.5	30	26	346	−45.9	----	24	354	−38.7	53					29	359	−37.8	56
9,000	27	298	−49.4	----	17	304	−48.6	----	28	322	−34.0	29	26	298	−52.6	----	24	306	−45.7	----					29	310	−45.7	----
10,000	26	256	−54.4	----	15	261	−53.7	----	28	279	−41.9	----	26	254	−57.3	----	23	262	−51.0	----					29	266	−52.8	----
11,000	24	219	−56.7	----	14	223	−56.1	----	28	240	−49.4	----	24	218	−57.3	----	23	225	−55.4	----					29	228	−57.7	----
12,000	23	187	−54.8	----	8	190	−57.0	----	27	206	−55.5	----	20	186	−55.1	----	22	192	−56.3	----					27	194	−59.8	----
13,000	20	161	−54.1	----	6	162	−57.3	----	27	175	−60.3	----	18	160	−54.1	----	22	164	−56.4	----					26	165	−59.8	----
14,000	19	137	−55.0	----	5	138	−55.7	----	27	149	−64.6	----	16	137	−55.2	----	19	140	−57.6	----					25	141	−59.2	----
15,000	14	118	−56.2	----					27	126	−69.0	----	15	117	−55.9	----	17	120	−59.0	----					25	119	−60.6	----
16,000	11	100	−57.6	----					27	106	−72.2	----	11	100	−56.9	----	10	102	−60.6	----					22	102	−62.0	----
17,000	9	84	−58.2	----					24	90	−74.4	----	6	86	−57.1	----	8	87	−61.7	----					21	86	−62.5	----
18,000	5	72	−58.0	----					22	75	−73.5	----					5	74	−61.2	----					17	73	−62.2	----
19,000									14	63	−70.7	----													8	62	−61.8	----
20,000									5	53	−65.5	----																

See footnotes at end of table.

TABLE 1.—*Mean free-air barometric pressure (P.) in millibars, temperature in ° C., and relative humidities (R. H.) in percent obtained by airplanes and radiosondes during February 1940*—Continued

Altitude (meters) m s. l.	Oklahoma City, Okla. (391 m.)				Omaha, Nebr. (301 m.)				Pearl Harbor, T. H.[1 2] (6 m.)				Pensacola, Fla.[3] (24 m.)				Phoenix, Ariz. (339 m.)				St. Louis, Mo. (171 m.)				San Antonio, Tex. (174 m.)			
	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.
Surface	29	970	2.7	82	29	982	−5.3	90	29	1,015	19.2	88	28	1,016	9.5	78	29	976	11.0	55	29	997	−0.3	81	29	997	10.4	79
500	29	956	3.4	81	29	958	−4.4	88	29	959	18.6	78	28	939	7.9	72	29	958	14.2	53	29	956	−1.8	80	29	959	11.3	75
1,000	29	909	3.4	71	29	899	−3.3	79	29	905	14.8	81	28	902	6.4	65	29	903	12.0	50	29	898	−2.7	77	29	902	9.6	72
1,500	29	846	2.8	64	29	844	−2.6	69	29	854	12.5	72	28	849	5.0	55	29	850	8.3	50	29	843	−2.3	72	29	850	8.1	67
2,000	29	795	1.2	60	29	792	−3.9	67	29	804	11.7	48	28	799	3.6	46	29	800	4.8	40	29	792	−4.0	69	29	800	6.5	60
2,500	29	747	−1.5	58	29	743	−6.0	65	29	756	9.8	33	28	751	1.5	44	29	752	2.0	48	29	743	−5.9	67	29	752	4.3	54
3,000	29	701	−3.7	57	29	697	−8.5	63	29	712	7.2	24	28	705	−.5	44	29	706	−.4	47	29	697	−8.5	66	29	707	1.8	49
4,000	28	617	−9.3	55	29	612	−14.0	62	28	630	1.6	18	28	622	−5.8	46	29	623	−6.2	45	29	612	−13.7	64	29	624	−4.6	44
5,000	28	542	−15.7	52	29	536	−20.2	62					27	547	−11.7	46	29	547	−12.9	43	29	535	−20.0	61	29	549	−10.8	41
6,000	28	473	−23.2	52	29	467	−27.0	60					27	479	−18.1	47	29	479	−19.9	43	28	467	−26.7	59	29	481	−18.0	38
7,000	28	412	−30.9	51	28	406	−34.7	58					25	418	−25.1	50	29	418	−27.6	42	28	406	−34.1	56	29	420	−25.3	38
8,000	28	358	−38.5	50	28	351	−42.6						25	363	−32.2	52	28	363	−35.3	41	28	351	−41.3		29	365	−32.9	38
9,000	27	308	−46.0		28	302	−50.1						23	315	−39.0	56	28	314	−42.9		28	302	−48.5		29	316	−39.7	37
10,000	27	264	−52.6		28	258	−56.3						23	272	−45.2		26	270	−50.1		28	259	−54.3		29	272	−46.1	
11,000	26	226	−55.8		28	221	−58.6						22	234	−50.6		24	231	−55.9		28	222	−57.9		28	234	−50.7	
12,000	26	193	−56.5		27	188	−56.5						18	200	−54.8		23	197	−59.0		27	189	−57.1		27	200	−54.0	
13,000	25	165	−56.9		25	161	−55.3						14	170	−58.4		18	168	−60.4		27	161	−56.6		23	171	−57.5	
14,000	20	141	−58.1		24	137	−55.6						13	144	−61.2		15	142	−61.0		26	138	−57.7		22	146	−60.0	
15,000	19	120	−60.4		21	117	−57.2						10	123	−63.9		12	121	−63.5		23	117	−59.3		22	124	−63.1	
16,000	15	102	−62.9		20	100	−58.7						8	104	−66.5		9	103	−65.5		19	100	−60.1		19	106	−65.7	
17,000	9	87	−63.7		12	86	−59.5						6	88	−69.7		7	87	−67.0		14	85	−60.3		13	90	−67.2	
18,000	5	74	−61.1		9	73	−59.5														5	72	−60.2		10	76	−66.9	
19,000																									5	64	−67.1	

Altitude (meters) M. S. L.	San Diego, Calif.[1] (19 m.)				S. Ste. Marie, Mich. (221 m.)				Seattle, Wash.[2] (27 m.)				Shreveport, La.[4] (51 m.)				Spokane, Wash. (598 m.)				Washington, D. C.[2] (7 m.)			
	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P	T.	R. H.	Number of observations	P.	T.	R. H.	Number of observations	P.	T.	R. H.
Surface	28	1,015	13.6	84	29	992	−5.6	81	26	1,009	7.0	84	21	1011	7.3	82	29	944	1.1	88	28	1,014	0.8	73
500	28	958	12.1	70	29	957	−9.2	86	26	953	5.5	79	21	958	6.8	82					28	954	.4	64
1,000	28	902	9.4	69	29	897	−11.1	87	26	896	2.5	79	21	902	6.1	78	29	898	.4	87	28	896	−.6	65
1,500	28	849	6.6	63	29	840	−12.4	83	26	842	−.6	79	21	848	5.6	72	29	843	−1.7	84	28	842	−2.2	53
2,000	28	799	4.1	55	29	786	−13.0	81	25	791	−3.8	78	20	798	4.0	67	29	791	−4.7	81	28	791	−4.0	63
2,500	28	751	1.9	51	29	736	−14.5	78	25	742	−6.9	76	20	750	1.8	64	28	742	−7.8	79	28	742	−5.8	66
3,000	28	705	−.2	50	29	689	−16.2	75	25	695	−9.8	74	18	704	−.5	62	28	696	−11.0	76	28	695	−8.0	71
4,000	27	621	−5.8	47	29	602	−21.4	71	24	610	−16.2	70	16	622	−5.7	58	28	610	−17.2	69	28	611	−13.2	67
5,000	26	546	−12.0	47	29	525	−27.3	69	23	533	−22.7	70	14	547	−11.7	56	28	533	−24.5	67	28	534	−19.2	63
6,000	26	478	−18.9	50	29	456	−33.9	68	21	464	−29.9	72	11	479	−17.7	54	28	464	−32.0	65	28	466	−26.0	67
7,000	26	418	−25.9	57	29	395	−41.0		19	403	−37.7	75	9	419	−23.9	53	28	401	−39.7	64	27	405	−33.7	71
8,000	25	363	−33.3	68	29	340	−47.9		16	348	−44.3		7	365	−31.6	48	28	346	−47.2		26	350	−41.3	
9,000	24	315	−40.8	67	28	292	−53.8		14	300	−50.6		6	316	−39.2		27	297	−52.9		25	301	−48.3	
10,000	22	271	−48.2		26	249	−56.5		12	257	−54.2		5	272	−46.7		27	254	−55.7		20	258	−54.4	
11,000	22	233	−55.2		25	213	−56.0		9	220	−56.0		5	233	−53.2		27	217	−55.3		14	220	−58.9	
12,000	21	198	−60.3		24	182	−54.1		7	188	−53.8						27	185	−54.1		10	188	−57.5	
13,000	19	169	−62.5		21	156	−53.7		7	161	−53.7						24	159	−53.2		8	160	−57.9	
14,000	12	144	−64.3		19	133	−53.7		6	138	−54.5						23	136	−53.9		7	136	−59.4	
15,000	11	122	−66.3		10	114	−54.8										16	116	−54.6					
16,000	8	104	−68.5		5	97	−55.5										15	99	−55.3					
17,000	5	88	−69.3														7	85	−56.1					

[1] U. S. Army, Patterson Field (Fairfield), Ohio.
[2] U. S. Navy.
[3] Airplane observations.
[4] U. S. Army, Barksdale, Field La.

NOTE.—All observations taken at 1 a. m., 75th meridian time, except those at Washington, D. C., Lakehurst, N. J., Norfolk, Va., and Pensacola, Fla., where they are taken before 5 a. m., 75th meridian time. At Pearl Harbor, T. H., observations are taken after sunrise.

None of the means included in this table are based on less than 15 surface or 5 standard level observations.

Number of observations refers to pressure only as temperature and humidity data are missing for some observations at certain levels; also, the humidity data are not used in daily observations when the temperature is below −40.0° C.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during February 1940*

[Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second]

Altitude (meters) m. s. l.	Abilene, Tex. (537 m.)			Albuquerque, N. Mex. (1,554 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (870 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (18 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	25	241	2.5	28	287	2.8	28	266	2.4	28	299	1.6	28	331	0.9	26	102	0.8	28	174	2.4	25	288	2.6	28	332	1.4	28	245	2.6
500							28	253	3.6										28	183	2.8	25	267	4.0	28	316	2.3	28	240	4.8
1,000	25	241	3.1				25	248	5.5				25	289	2.2	26	112	1.0	26	239	2.7	17	294	4.9	25	304	3.9	27	256	6.9
1,500	23	253	5.5				20	268	5.1	28	265	3.7	17	299	4.6	26	227	2.9	24	283	5.3	13	328	6.3	20	318	5.1	25	257	7.8
2,000	22	271	8.4	28	284	3.9	17	279	7.7	26	264	7.6	11	293	8.3	25	254	5.1	20	294	8.8	12	316	8.3	16	332	6.1	16	264	8.7
2,500	22	279	10.7	28	286	4.8	16	287	10.8	25	275	9.0	10	304	9.6	20	271	8.2	17	285	11.6	11	314	8.9	13	320	7.5	15	265	11.0
3,000	21	280	12.3	27	294	7.8	16	283	12.6	23	265	9.1				17	278	8.2	15	285	12.4	10	309	8.5				10	285	14.5
4,000	19	280	16.2	19	296	13.4	14	289	17.8	20	280	11.6							13	279	14.4									
5,000	17	280	18.8	16	299	18.4	12	287	23.5	16	280	15.5							13	280	19.7									
6,000	14	273	21.4	15	289	22.6	12	286	26.5	15	284	15.5							13	276	24.1									
8,000	11	270	32.6	11	293	30.4				10	305	25.0							11	267	25.3									

Altitude (meters) m. s. l.	Chicago, Ill. (192 m.)			Cincinnati, Ohio (157 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,196 m.)			Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (766 m.)			Jacksonville, Fla. (14 m.)			Las Vegas, Nev. (570 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	23	293	1.4	27	258	0.8	28	63	1.0	29	261	2.8	25	201	1.1	26	324	1.3	26	266	2.5	23	316	0.4	28	246	1.1	29	81	0.8
500	23	283	1.8	27	271	1.5													26	256	3.6				28	257	4.1			
1,000	16	278	2.2	17	210	2.3													25	272	5.2	23	245	2.2	26	261	5.8	29	136	.7
1,500	14	295	2.8	15	272	4.6				29	270	4.3							25	285	6.6	23	269	6.2	24	272	7.3	29	215	1.6
2,000	10	310	4.3	11	283	6.6	28	317	1.3	29	268	5.3	25	208	1.2	26	357	.3	22	293	9.8	21	272	7.8	23	276	8.7	28	251	2.4
2,500	10	309	5.8	11	284	8.8	28	301	2.9	29	272	8.1	25	233	2.7	25	239	1.6	20	292	11.4	20	268	9.0	22	274	11.3	24	290	4.3
3,000							26	299	6.0	28	273	10.3	24	263	4.2	25	251	4.4	18	295	14.2	17	269	8.7	21	273	12.7	23	293	6.5
4,000							23	304	9.3	24	278	13.4	19	298	10.9	20	273	9.5	16	282	17.0	11	269	10.9	18	281	17.7	23	299	10.2
5,000							22	304	13.6	18	281	15.7	10	307	14.1	14	280	14.2	15	287	24.5				17	284	21.0	21	291	14.4
6,000							20	297	16.7	15	292	18.9							15	281	27.5				13	284	27.7	18	296	19.1
8,000							15	289	24.5										11	278	33.6									

Altitude (meters) m. s. l.	Little Rock, Ark. (79 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (10 m.)			Minneapolis, Minn. (261 m.)			Mobile, Ala. (10 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)			Oakland, Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	26	257	0.3	25	286	0.7	29	167	0.7	25	310	0.7	27	217	1.1	17	182	0.4	24	326	5.0	25	245	2.4	22	291	1.6	26	331	1.6
500	26	258	2.1	25	289	.8	29	233	1.1	25	295	.6	27	221	3.5	17	192	1.5	24	321	5.4	25	242	1.9	22	280	1.2	26	336	1.7
1,000	22	244	3.9	25	206	2.0	28	248	2.3	20	220	.2	22	271	4.2	16	217	3.0	23	323	6.8	23	273	2.2	22	267	3.5	18	306	2.4
1,500	16	280	5.7	24	211	5.4	27	251	4.6	16	267	3.2	18	290	6.1	15	257	5.1	21	306	9.6	20	282	2.4	18	274	5.4	15	281	4.8
2,000	14	296	8.0	22	229	6.2	24	258	7.4	16	276	6.4	15	294	6.9	13	281	5.7	17	308	11.2	19	281	2.6	18	277	8.1	14	270	7.2
2,500	14	292	9.3	18	233	7.6	21	268	10.9	13	288	9.8	15	284	9.8	13	288	8.5	12	312	10.1	17	259	4.0	18	288	10.3	13	269	7.9
3,000	12	295	12.3	11	254	5.2	21	261	12.3	12	286	12.2	15	281	12.2	13	295	11.6				15	308	7.3	18	281	11.5	12	279	8.5
4,000	11	291	17.0				20	267	15.6	10	296	15.4	10	275	14.0							13	306	9.8	16	284	13.9	11	295	12.0
5,000							17	273	17.9													11	310	14.0	14	282	17.9	11	301	13.6
6,000							12	272	20.0																13	284	22.6	10	292	19.9

Altitude (meters) m. s. l.	Phoenix, Ariz. (344 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			San Antonio, Tex. (183 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie Mich. (230 m.)			Seattle, Wash. (14 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (10 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	28	289	0.9	25	2	3.0	26	268	0.5	27	247	1.9	28	273	2.7	26	7	1.6	23	194	3.3	19	204	0.9	25	317	2.4
500	28	281	1.1				26	262	1.5	27	266	1.6	28	258	2.3	26	360	1.3	23	206	4.7				25	307	4.0
1,000	28	254	1.5	25	2	2.9	19	227	3.2	26	266	2.9	27	248	1.7	22	334	1.4	19	208	7.1	19	190	2.9	20	296	6.3
1,500	27	254	1.7	25	308	4.3	15	263	5.8	22	275	5.1	24	285	1.5	21	332	2.0	13	195	5.7	18	223	4.9	20	294	9.1
2,000	27	274	3.3	20	300	6.8	12	272	8.3	22	276	6.9	24	290	3.7	18	338	3.2	10	221	6.1	14	226	5.7	17	295	10.9
2,500	27	288	5.6	18	303	8.1	10	289	8.3	20	273	9.5	23	288	5.8	15	325	5.8							17	294	11.1
3,000	27	288	7.0	18	298	10.9				19	280	11.2	19	295	8.4	12	299	7.7							16	295	13.8
4,000	25	289	10.0	15	302	13.3				17	279	14.7	16	292	10.9										14	292	17.0
5,000	21	291	13.5	13	294	15.3				14	282	18.9	14	282	11.9												
6,000	11	285	16.5	13	286	16.7				13	281	20.7	13	276	14.2												
8,000				11	294	22.2				12	284	22.9															

TABLE 3.—*Maximum free air wind velocities (M. P. S.), for different sections of the United States based on pilot balloon observations during February 1940*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	46.8	NNW	1,280	15	Harrisburg, Pa	41.2	NW	4,930	26	Kylertown, Pa	64.0	W	10,930	17	Buffalo, N. Y.
East-Central [2]	44.2	NNW	2,160	14	Greensboro, N. C.	63.9	NW	5,000	14	Greensboro, N. C.	81.5	W	11,360	15	Greensboro, N. C.
Southeast [3]	43.0	WNW	1,730	14	Charleston, S. C.	43.3	WNW	4,380	21	Miami, Fla.	80.1	WSW	10,820	7	Jacksonville, Fla.
North-Central [4]	31.6	N	2,300	2	Sault Ste. Marie, Mich.	45.0	WNW	4,870	22	Fargo, N. Dak.	80.0	WNW	9,830	21	Rapid City, S. Dak.
Central [5]	37.1	S	1,220	23	Springfield, Mo.	60.0	NW	4,960	25	Moline, Ill.	68.4	W	11,070	16	Springfield, Ill.
South-Central [6]	38.2	WNW	1,000	17	Brownsville, Tex.	42.8	W	4,770	13	Abilene, Tex.	70.0	SW	10,990	8	San Antonio, Tex.
Northwest [7]	39.4	WNW	1,570	9	Havre, Mont.	40.7	WNW	4,130	24	Butte, Mont.	80.0	WNW	9,380	21	Billings, Mont.
West-Central [8]	33.8	WNW	2,480	11	Cheyenne, Wyo.	47.0	W	4,140	14	Reno, Nev.	71.0	WNW	10,200	21	Denver, Colo.
Southwest [9]	30.6	N	830	8	Burbank, Calif.	43.1	WNW	2,910	4	El Paso, Tex.	80.0	SSW	9,780	29	Winslow, Ariz.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia, southern Ohio, Kentucky, eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, northern Nevada, and northern California.
[9] Southern California, southern Nevada, Arizona, New Mexico, and extreme west Texas.

TABLE 4.—*Mean altitudes and temperatures of significant points identifiable as tropopauses during February 1940, classified according to the potential temperatures (10° intervals between 290° and 409° A.) with which they are identified (based on radiosonde observations)*

Potential temperatures, °A.	Albuquerque, N. Mex.			Atlanta, Ga.			Billings, Mont.			Bismarck, N. Dak.			Boise, Idaho			Buffalo, N. Y.			Charleston, S. C.		
	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.
290–299							4	7.4	−49.8	4	7.6	−51.8	5	7.5	−51.0	1	7.5	−55.0			
300–309	4	8.0	−48.5	1	6.9	−38.0	16	8.3	−52.0	12	8.0	−49.9	11	8.5	−53.3	9	8.2	−50.6			
310–319	12	9.6	−55.4	7	8.8	−48.4	29	9.5	−55.6	28	9.8	−59.5	16	9.6	−56.5	23	9.6	−57.7	11	8.8	−47.2
320–329	15	10.5	−57.1	24	10.2	−54.3	10	10.7	−61.0	13	10.8	−62.7	17	10.6	−59.0	14	10.7	−61.6	13	10.2	−53.7
330–339	14	11.5	−59.2	16	11.6	−60.3	3	11.8	−64.3	2	11.0	−57.0	8	11.7	−62.6	4	11.1	−57.8	12	11.5	−58.5
340–349	3	12.5	−62.7	5	12.2	−61.0	1	11.1	−56.0				1	11.8	−58.0	1	12.0	−62.0	6	12.3	−60.5
350–359	2	13.2	−64.0	2	13.0	−61.0										1	11.7	−55.0	2	13.0	−60.5
360–369	1	13.8	−61.0	2	13.2	−60.0													2	13.6	−62.5
370–379	1	15.4	−70.0	3	14.3	−62.7										2	13.0	−53.5	1	13.9	−62.0
380–389	6	15.2	−66.3	3	14.6	−58.3										1	13.7	−57.0	4	15.2	−65.2
390–399	1	16.1	−68.0	3	16.1	−68.7				1	14.6	−55.0							4	16.0	−68.2
400–409	3	16.3	−67.3	4	16.0	−64.2	1	14.9	−56.0				1	15.1	−56.0	1	15.2	−56.0	1	16.3	−66.0
Weighted means		11.6	−59.0		11.6	−57.4		9.5	−55.6		9.6	−57.6		9.9	−57.0		10.1	−57.4		13.4	−57.0
Mean potential temperature °A. (weighted)		337.2			340.6			315.1			314.6			318.6			322.6			340.9	

Potential temperatures, °A.	Denver, Colo.			El Paso, Tex.			Ely, Nev.			Fairbanks, Alaska			Joliet, Ill.			Juneau, Alaska			Lakehurst, N. J.		
	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m.s.l.	Mean temperature °C.
290–299	1	6.5	−43.0				3	6.4	−39.0	10	7.0	−47.3				10	7.3	−50.8			
300–309	11	8.1	−49.6	3	7.9	−46.3	8	7.6	−45.1	30	8.4	−54.5	5	8.2	−50.2	21	8.4	−53.4	5	8.2	−50.4
310–319	10	9.3	−52.3	10	8.6	−44.1	18	9.6	−55.9	11	9.5	−58.0	15	9.4	−53.9	14	9.5	−57.0	11	9.5	−55.6
320–329	19	10.5	−57.9	16	10.6	−56.9	15	11.0	−60.9	5	10.6	−61.4	14	10.3	−59.2	7	10.1	−58.1	12	10.5	−60.3
330–339	5	11.9	−63.2	10	11.4	−58.1	10	11.3	−58.8				4	11.0	−58.2	2	10.6	−56.5	3	11.1	−59.0
340–349	2	12.0	−58.5	12	12.4	−61.3	1	11.5	−57.0				2	12.2	−64.0				1	11.1	−54.0
350–359				4	13.2	−63.2	2	12.9	−59.5												
360–369				1	15.0	−69.0							1	13.1	−58.0						
370–379				3	14.4	−63.0	1	14.1	−62.0												
380–389				7	15.4	−66.6	2	14.6	−60.0												
390–399				7	15.9	−65.7	1	15.4	−63.0										1	15.5	−62.0
400–409	1	16.0	−64.0	3	16.1	−64.7	1	15.6	−60.0										1	15.6	−61.0
Weighted means		10.0	−55.3		12.1	−58.4		10.4	−55.9		8.6	−54.5		9.7	−54.7		8.8	−54.6		10.2	−57.1
Mean potential temperature °A. (weighted)		320.2			346.0			325.7			307.1			321.2			309.2			324.1	

TABLE 4.—*Mean altitudes and temperatures of significant points identifiable as tropopauses during February 1940, classified according to the potential temperatures (10° intervals between 290° and 409° A) with which they are identified (based on radiosonde observations)*—Continued

Potential temperatures, °A	Miami, Fla.			Minneapolis, Minn.			Nashville, Tenn.			Oakland, Calif.			Oklahoma City, Okla.			Omaha, Neb.			Pensacola, Fla.		
	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.
290–299				3	7.2	−49.0	1	6.2	−41.0												
300–309				6	8.6	−54.3	1	7.7	−42.0	2	7.7	−44.0	3	8.0	−45.7	3	8.0	−49.3			
310–319	1	7.0	−30.0	19	9.6	−57.5	15	8.9	−48.0	17	9.1	−50.1	21	9.0	−49.4	26	9.6	−55.7	5	8.0	−41.2
320–329	4	10.2	−51.2	11	10.4	−58.9	19	10.6	−56.4	24	10.6	−57.0	17	10.5	−57.4	19	10.8	−60.8	5	9.7	−46.0
330–339	15	11.2	−53.0	3	10.9	−57.3	10	11.6	−60.8	14	12.0	−64.9	14	11.3	−58.1	4	11.4	−62.0	8	11.2	−54.4
340–349	18	12.8	−60.8				1	11.6	−57.0	6	12.1	−59.7	4	12.0	−58.8	1	12.9	−68.0	6	12.3	−59.8
350–359	3	13.6	−64.3				1	12.2	−56.0	2	12.8	−61.0	1	11.8	−52.0				1	13.0	−61.0
360–369	6	14.9	−70.2				1	13.7	−63.0										2	14.3	−66.0
370–379	7	15.6	−72.9							2	13.8	−57.5	3	14.2	−61.7	1	14.1	−60.0	2	14.9	−64.5
380–389	10	16.4	−74.9	1	14.2	−56.0	1	13.5	−54.0				2	15.1	−63.0	1	14.6	−61.0			
390–399	5	16.8	−74.8	2	14.2	−53.5	1	15.7	−63.0	6	15.2	−62.0							1	16.5	−70.0
400–409	10	17.4	−75.6				2	15.6	−60.0	2	16.2	−64.5	2	15.8	−60.5	1	15.3	−57.0	1	16.9	−68.0
Weighted means		14.0	−64.9		9.9	−56.6		10.6	−54.6		11.2	−57.5		10.7	−55.0		10.4	−57.9		11.5	−54.5
Mean potential temperature °A. (weighted)	365.6			320.4			330.5			334.9			330.5			323.1			341.3		

Potential temperatures, °A.	Phoenix, Ariz.			San Antonio, Tex.			San Diego, Calif.			Sault Ste. Marie, Mich.			Spokane, Wash.			St. Louis, Mo.			Washington, D. C.		
	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.	Number of cases	Mean altitude (km.) m. s. l.	Mean temperature °C.
290–299										7	6.8	−46.6	3	8.1	−55.0						
300–309	3	7.5	−42.3							14	8.1	−52.4	19	8.4	−52.3	3	8.1	−51.0	5	8.3	−50.4
310–319	8	9.2	−49.5	4	8.4	−43.2	4	8.4	−38.2	31	9.5	−57.7	17	9.6	−57.4	11	9.6	−55.7	7	9.0	−50.6
320–329	20	10.4	−55.1	18	10.0	−49.3	13	10.5	−55.5	12	10.6	−61.4	10	10.6	−59.6	26	10.5	−57.6	12	10.5	−58.6
330–339	11	11.9	−61.5	19	11.0	−52.9	7	11.0	−54.0				2	11.6	−64.0	6	11.6	−62.2	3	11.6	−60.7
340–349	6	12.5	−61.5	7	12.5	−59.9	8	12.1	−58.4	1	11.4	−53.0				2	12.3	−60.0			
350–359	1	12.2	−56.0	5	12.9	−60.2	2	13.2	−63.0							1	12.9	−61.0			
360–369				4	14.2	−65.5	1	13.7	−64.0												
370–379	1	13.7	−61.0	5	15.1	−68.4	1	14.8	−65.0	1	12.7	−52.0				4	14.2	−61.2			
380–389	1	15.7	−67.0	3	15.0	−62.0	1	15.1	−66.0							1	14.8	−62.0			
390–399				7	16.2	−68.4	1	15.1	−70.0							2	15.4	−63.0			
400–409	1	16.9	−70.0	2	17.0	−71.0							1	14.8	−55.0	4	15.6	−62.0	1	15.3	−60.0
Weighted means		10.9	−56.2		12.2	−56.7		11.3	−55.5		9.2	−55.9		9.4	−56.0		11.2	−58.3		10.0	−55.4
Mean potential temperature °A. (weighted)	330.6			347.4			336.6			312.9			314.4			336.0			322.8		

RIVERS AND FLOODS

[River and Flood Division, MERRILL BERNARD in charge]

By BENNETT SWENSON

The precipitation during February was generally above the average over most of the country and decidedly so from the Rocky Mountains westward, except in parts of the far Southwest. It was also well above the normal in much of the Gulf States and over the Ohio Valley northeastward to the interior of New England. The precipitation from western Pennsylvania northeastward was largely in the form of snow. Temperatures averaged below normal in the South Atlantic area and in all sections south of the Ohio River although departures were not marked. In all other sections of the country the temperatures were higher than normal.

Atlantic slope drainage.—Considerable precipitation, mainly in the form of snow, added to the existent snow cover during the month over much of the area from western Pennsylvania northeastward into the interior of New England. There were two outstanding storms, February 14 and 19 which deposited most of the snow over the above-mentioned area.

Over the Susquehanna Basin mild weather during much of the month resulted in a considerable reduction of the ice thickness in the streams and of the snow depth particularly in the lower portions. Surveys made near the end of February indicate that the snow depth averaged 16.6 inches over the upper basin above Towanda, Pa., and 9.4 inches in the basin at and below Towanda. The maximum depth was 36 inches at Worcester, N. Y., and the minimum was no snow at several points in the lower basin. No flooding or any appreciable rises occurred, but the snow cover continued as a serious flood threat.

Rises, accompanied by minor flooding at a few places, occurred in the streams of the Atlantic drainage from the James River southward. These resulted from moderately heavy rains on the 13th and again on the 19th. No appreciable damage was reported.

East Gulf of Mexico drainage.—Heavy rains on the 5th, 13th, and 17th of the month over much of this area caused rises in most of the streams with some flooding.

The Apalachicola River crested at 20.9 feet at Blountstown, Fla. (flood stage 15 feet), on February 22. A rapid rise to slightly above flood stage occurred at Newton, Ala., on the upper Choctawhatchee River and a slower rise to slightly above flood stage at Caryville, Fla., on the lower reaches during the period February 19 to 22. At Centerville, Ala. (flood stage 23 feet), on the Cahaba River two crests occurred, 27 feet on the 6th and 25.3

feet on the 19th. Heavy rains on February 5 and 6 over the Black Warrior watershed and that of the Tombigbee south of Columbus, Miss., caused some flooding in the former stream from Tuscaloosa, Ala., southward and, in the latter from Demopolis, Ala., southward. Slight flooding also occurred in the Pearl and Pascagoula Rivers. The losses from these floods as shown in the table below were only slight or moderate.

Mississippi River system.—The stages during the month were, as a rule, unusually low except in portions of the Ohio watershed where some flooding took place. At Omaha, Nebr, the Missouri River reached its lowest February stage of record, 2.1 feet on the 29th. The river stage at St. Louis, Mo., was continuously below zero on the gage from September 19, 1939, to March 3, 1940, inclusive, which is the longest period of continuous subzero gage readings of record (1861 to date). The previous longest period was from September 7, 1937, to January 25, 1938, inclusive. In the lower Mississippi, subzero stages persisted at Vicksburg, Miss., from September 8, 1939, to February 19, 1940, which has never been equalled previously for duration. The low stages at Greenville, Miss., −5.9 feet, February 1, and at Vicksburg, Miss., −6.95 feet, February 3, are the lowest stages of record at those points. Following are a number of low stages during the past fall and winter resulting from drought conditions in the Mississippi watersheds:

River and station	Lowest stage, fall and winter, 1939–40	Previous lowest stage and date
MISSOURI RIVER		
Kansas City, Mo.[1]	0.4, Jan. 9	−2.7, Jan. 9, 1937.
ARKANSAS RIVER		
Little Rock, Ark.	−1.9, Oct. 22[2]	−4.2, Aug. 22, 1934.
RED RIVER		
Shreveport, La.	0.2, Nov. 8, 9	1.7, Sept. 13, 1936.
MISSISSIPPI RIVER		
Keokuk, Iowa	−3.4, Dec. 31, Jan. 2	−4.3, Jan. 3, 1934.
St. Louis, Mo.	−0.1, Jan. 16	−5.5, Dec. 12, 1937.
Memphis, Tenn.	−0.6, Oct. 25, 28	−2.7, Nov. 9, 1895.
Greenville, Miss.	−5.9, Feb. 1	−4.2, Aug. 27, 1936.
Vicksburg, Miss.	−6.95, Feb. 3	−6.5, Nov. 13, 1895.

[1] Ice reading. [2] And later dates.

Streams were generally frozen in northern sections, and floating ice was observed during the month in the Mississippi River as far south as White Castle, La., and in the Atchafalaya River, from the Mississippi, at Simmesport, La. Medium to heavy ice which reached Helena, Ark., on January 23, formed a gorge at that point on the 30th. The gorge moved out on February 4 and on the 6th the river was practically clear of ice and open to navigation.

Flood stage was exceeded at Parkers Landing, Pa., on the Allegheny River, where the water was backed up by an ice jam a short distance below that gage. The following report was submitted by the official in charge, Pittsburgh, Pa.:

A small ice jam formed in the Allegheny River at West Monterey, Pa., about 5 miles downstream from Parkers Landing on January 11, when ice from the upper river came down. This gorged ice held the river stage at Parkers Landing at a 10- to 14-foot stage during the remainder of January and the early part of February. Light to moderate rainfall and mild weather of February 10 and 11 brought some of the ice from the upper river out again, and piled it on top of the gorged ice below Parkers Landing, which by this time was frozen solid to a considerable depth. The additional ice closed the passages through the gorge, and quickly raised the water to a 24.4-foot stage at Parkers Landing.

At 5 p. m. of February 12, the stage was 14 feet, and by 8:30 p. m. the stage was 24.4 feet. The water and heavy cakes of ice covered the highway from the Highway Bridge at the upper end of the town to the lower end of the town a distance of about one-half mile. At the Parker end of the bridge, the ice was forced over the top of the guard rail, and completely closed the entrance to the bridge with ice as high as the rail. Water covered the first floors of most of the buildings in the town along the highway, and of the glass factory near the bridge. By midnight of the 12th the water had receded to 22.3 feet, leaving the entrance to the bridge and the highway covered with ice. From the 12th to the 16th the water level fluctuated each day around the 22-foot stage, dropping below 20 feet about 4:30 a. m. of the 16th.

Considering the high stage reached, the damage caused by the high water was small, due to the fact that it occurred in only a short stretch of the river, that practically everything that could be moved was raised up out of reach of the water. Telephone and telegraph lines were out of service for several hours during the night of February 12. The greatest item of expense was the cleaning up after the water receded, and removing the heavy ice from the highway in the town of Parkers Landing. The estimated total damage is $300.

At the end of the month there was considerable snow in the mountains and the northern portions of the Allegheny Basin, ranging in depth from 12 to 30 inches, while in the lowlands of the same basin the depths ranged from 3 to 7 inches. Over the lower 50 miles of the Monongahela the greater portion of the ground was covered with snow from an inch to several feet in depth. This snow was of high water content equivalent to 3 or 4 inches of water. On the upper Youghiogheny, in higher elevations, there was considerable snow, but in the Tygart and West Fork Basins in West Virginia the snow was negligible.

Ice continued in the Ohio River until about the 13th when navigation, which had been suspended since January 18, was resumed. A moderate rise occurred in the lower reaches on February 11 but did not reach flood stage.

Pacific slope drainage.—Kings River reached flood stage for a short time on February 26 and moderately high stages continued in all streams of the southern San Joaquin Basin during the remainder of the month. No damage occurred although excess waters emptying into Tulare Basin threatened levees of some reclaimed areas. At mountain stations in this area the February precipitation was slightly more than twice the February normal and at most points the seasonal total to the end of February was above normal for the entire season.

In the Sacramento River Basin proper frequent heavy rains during the month kept the streams at high levels, developing into a flood of great proportions at the close of the month. A report will be made on this flood at a later date.

TABLE OF ESTIMATED FLOOD LOSSES

Drainage and river	Tangible property	Matured crops	Prospective crops	Livestock and other movable farm property	Suspension of business	Total
Atlantic slope drainage: Savannah River					$500	$500
East Gulf of Mexico drainage:						
Apalachicola River				$350	1,800	2,150
Choctawhatchee River	$12,000	$3,500		1,000	2,000	18,500
Tombigbee River	2,200		$750	500		3,400
Pearl and Pascagoula Rivers	250				3,000	3,250
Ohio River Basin: Allegheny River	300					300
Pacific slope drainage: Eel River	455,000	500	20,000	1,000	10,000	486,500

One of the three greatest floods of record occurred in the Eel River Delta from February 27 to 29 as the result of heavy rains during the night of the 26th. At Dos Rios, Calif., the river rose 30 feet in 24 hours to a stage of 38.9 feet at 8 a. m. on the 27th and to 45.4 feet in the next 24 hours. A crest stage of 24.4 feet was reached at Fern-

bridge, Calif., on February 28, within a few inches of that established in the flood of December 1937. Considerable damage resulted.

Flooding of bottom lands occurred in some of the tributaries of the Williamette River in Oregon from February 6 to 29 but no material damage resulted.

FLOOD-STAGE REPORT FOR THE MONTH OF FEBRUARY 1940

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
ATLANTIC SLOPE DRAINAGE					
James:	*Feet*			*Feet*	
Columbia, Va.	10	12	14	11.4	13
		18	23	14.4	19
State Farm, Va.	12	11	11	13.0	12
Roanoke:					
Weldon, N. C.	31	21	22	32.1	21
Williamston, N. C.	10	12	(1)	11.0	17, 18, 28
Neuse:					
Neuse, N. C.	14	8	10	14.9	9
Smithfield, N. C.	13	8	11	14.0	10–11
Cape Fear: Lock 2, Elizabethtown, N. C.	20	8	13	26.0	9
		20	22	20.9	21
Saluda: Pelzer, S. C.	6	18	20	6.8	19
Santee:					
Rimini, S. C.	12	21	25	13.4	22–23
Ferguson, S. C.	12	23	26	12.5	25
Ogeechee: Dover, Ga.	7	20	23	7.1	21–23
Savannah:					
Butler Creek, Ga.	21	19	21	23.2	20
Clyo, Ga.	11	17	(1)	15.9	28
Ocmulgee: Abbeville, Ga.	11	21	28	11.8	26
Oconee: Milledgeville, Ga.	20	19	20	20.8	20
Altamaha: Charlotte, Ga.	12	18	(1)	15.1	29
EAST GULF OF MEXICO DRAINAGE					
Flint: Albany, Ga.	20	21	21	20.1	21
Apalachicola: Blountstown, Fla.	15	17	Mar. 3	20.9	22
Choctawhatchee:					
Newton, Ala.	19	19	19	19.8	19
Caryville, Fla.	12	19	24	12.9	22
Cahaba: Centerville, Ala.	23	6	7	27.0	6
		18	19	25.3	19
Black Warrior:					
		6	8	55.5	6
Lock No. 10, Tuscaloosa, Ala.	46	10	11	48.0	10
		19	20	48.2	19
Lock No. 7, Eutaw, Ala.	35	7	18	45.9	13
		19	25	41.8	22
Tombigbee:					
Lock No. 4, Demopolis, Ala.	39	7	28	50.9	14
Lock No. 3, Whitfield, Ala.	33	6	(1)	52.9	14–15
Lock No. 2, Pennington, Ala.	46	8	(1)	54.0	18–19
Lock No. 1, Alabama	31	9	(1)	36.7	19–21

FLOOD-STAGE REPORT FOR THE MONTH OF FEBRUARY 1940—Continued

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
EAST GULF OF MEXICO DRAINAGE—continued					
Chickasawhay: Shubuta, Miss.	*Feet* 26	10	11	*Feet* 26.6	11
Pascagoula: Merrill, Miss.	22	12	16	22.4	14, 15
Pearl:					
Jackson, Miss.	18	9	29	23.3	19
Pearl River, La.	12	10	(1)	15.0	13
MISSISSIPPI SYSTEM					
Ohio Basin					
Allegheny: Parkers Landing, Pa.	20	13	15	24.4	12
Lower Mississippi Basin					
Coldwater: Coldwater, Miss.	13	10	12	13.4	11
		18	21	13.5	20
PACIFIC SLOPE DRAINAGE					
San Joaquin Basin					
Kings: Piedra, Calif.	10	26	26	10.5	26
Mokelumne: Bensons Ferry, Calif.	12	28	(1)	------	------
Sacramento Basin					
Stony Creek: St. John, Calif.	12	28	28	13.9	28
North Fork: Colgate, Calif.	14	27	28	14.8	27–28
Feather:					
Oroville, Calif.	25	27	28	25.1	28
Nicolaus, Calif.	25	28	(1)	26.3	29
Sacramento:					
Kennett, Calif.	25	27	29	36.3	28
Red Bluff, Calif.	23	27	(1)	32.2	28
Hamilton City, Calif.	22	28	29	22.6	29
Knights Landing, Calif.	30	28	(1)	33.5	29
Humboldt Bay Basin					
Eel: Fernbridge, Calif.	17.5	27	(1)	24.4	28
Columbia Basin					
		6	10	13.0	8
Long Tom: Monroe, Oreg.	12	19	19	12.0	19
		27	(1)	13.1	29
		6	7	11.5	7
Santiam: Jefferson, Oreg.	10	26	26	10.0	26
		29	29	10.4	29
South Yamhill: Willamina, Oreg.	8	5	7	10.7	6

[1] Continued at end of month.

WEATHER ON THE ATLANTIC AND PACIFIC OCEANS

[The Marine Division, I. R. TANNEHILL in charge]

NORTH ATLANTIC OCEAN, FEBRUARY 1940

By J. H. GALLENNE

Atmospheric pressure.—Mean monthly pressures for February 1940 show negative departures from normal over practically all ocean areas from which reports were received, with the exception of Reykjavik, Iceland, where a positive departure of 9.9 millibars (0.29 inch) was noted. Average pressure values were highest over and adjacent to the Gulf of Mexico, diminishing off to the north-northeast, where the lowest value, 996.5 millibars (29.42 inches), was observed at Julianehaab, Greenland.

The pressure extremes noted from vessel reports were 1,033.2 millibars (30.51 inches) and 958 millibars (28.29 inches). The highest was observed on the American steamship *Excambion*, during the forenoon of the 17th, near latitude 36° N. and longitude 12° W., while the lowest, 958 millibars (28.29 inches), was reported from the steamship *Tulsa*, on the evening of February 1, in connection with an area of low pressure near 42° N. and 41° W.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure (sea level) at selected stations for the North Atlantic Ocean and its shores, February 1940*

Station	Average pressure	Departure	Highest	Date	Lowest	Date
	Millibars	*Millibars*	*Millibars*		*Millibars*	
Julianehaab, Greenland [1]	996.5	−3.5	1,020	16	955	6
Reykjavik, Iceland [2]	1,010.3	+9.9	1,032	12, 13	988	6
Lisbon, Portugal	1,017.6	−1.7	1,030	18	1,008	4
Horta, Azores	1,009.3	−11.7	1,027	27	991	7
Belle Isle, Newfoundland [3]	999.9	−6.2	1,022	24	970	12
Halifax, Nova Scotia	1,007.6	−5.3	1,025	19	969	11
Nantucket	1,011.5	−5.8	1,029	18	970	14
Hatteras	1,014.9	−4.7	1,031	23	988	14
Turks Island	1,016.3	−2.3	1,020	23	1,011	20
Key West	1,017.3	−1.0	1,028	23	1,008	17
New Orleans	1,016.9	−2.1	1,033	22	997	17

[1] For 21 days. [2] For 20 days. [3] For 24 days.

NOTE.—All data based on a. m. observations only, with departures compiled from best available normals related to time of observation, except Hatteras, Key West, Nantucket, and New Orleans which are 24-hour corrected means.

Cyclones and gales.—February 1940 was a stormy month on the North Atlantic Ocean. Gales and heavy weather were reported over some portion of the ocean on every day during the month, with winds of storm and hurricane force on 8 days.

The most severe conditions to affect our coastal sea area were those of February 3 and February 14–15. Charts XIV, XV, and XVI show the situations on the aforementioned dates.

During the evening of February 2, cylconic conditions developed to the east of Cape Hatteras, and on the morning of the 3d the center was near latitude 37° N. and longitude 62° W. The observer on the American steamship *Exmouth* passing near the center of the LOW on February 3, reported in the daily journal that winds of whole gale to hurricane force and high rough seas were experienced throughout the day. A press report from the Baltimore Evening Sun, stated that the steamship *Nishmaha*, on February 3, when about 600 miles east of Bermuda, encountered southwest wind of 60 miles an hour and that during the storm which lasted 3 days, 5 plates in the No. 1 hold cracked, causing the ship to leak so badly she was forced to heave to and turn on her sea pumps. A call for aid was sent out and the American Export Lines freighter *Extavia* stood by for 4 days. Finally the *Nishmaha* reached the port of Bermuda, where necessary repairs were made.

Several other vessels near this storm area reported winds of force 9–11 (Beaufort scale), with rough to high seas. The storm moved in a north-northeasterly direction for the next 48 hours, and from available reports, it appears to have merged with another depression in the vicinity of Greenland on the morning of February 5. Reports indicate that from February 6 to 12, practically all cyclonic activity lay over the north-central and north-western portions of the Atlantic, and that many vessels encountered winds of force 8 to 11 during that period.

The Danish steamship *Tennessee*, near latitude 53° N. and longitude 34° W. met westerly winds of hurricane force on the morning of February 10. On the morning of February 11 the entire seaboard from Maine to Florida experienced unsettled weather with high winds in the lower portion of the coastal area, and high winds to gales in the upper portion. The American steamship *Extavia*, at latitude 34.4° N. and longitude 63.7° W., reported a barometer reading of 1,004 millibars (29.65 inches); west wind of force 11; precipitous seas, heavy swell and violent rain squalls. This disturbance moved rapidly toward the north-northeast and was centered near Belle Isle, Newfoundland, on the morning of February 12.

A scarcity of ship reports from the northern and northeastern portions of the Atlantic makes it extremely difficult to chart the movement of cyclones and anticyclones in those regions.

On the evening of February 12 a shallow cyclonic system appeared over the eastern portion of Texas. It moved rather slowly northeastward for the next 36 hours, and at 7:30 a. m. (E. S. T.) of the 14th, the center of the depression lay between Norfolk, Va., and Washington, D. C. This disturbance increased in intensity and scope as it continued its progressive movement toward the northeast. At 7:30 p. m. (E. S. T.) of February 15, the steamship *President Harrison*, then a short distance to the west of the center of the LOW, reported a barometer reading of 975 millibars (28.79 inches). From reports at hand, indications are that during the next 2 or 3 days, this disturbance caused gales over a wide ocean area in higher latitudes. In connection with this cyclone, reports of hurricane-force winds were received from the steamship *Labette*, and the United States Coast Guard cutter *Chelan* during the evening of February 14 and morning of February 15. During the remainder of the month, less vigorous cyclones were reported from ships at sea over scattered portions of the North Atlantic.

It is impossible, due to lack of space, to include all gale reports received from vessels in the North Atlantic during February. The Ocean Gales and Storms table, found elsewhere in this REVIEW, includes all occurrences of winds in excess of force 9.

Fog.—There was less fog reported during February 1940, over the Gulf of Mexico and near the southeastern United States coast, than in the preceding month.

Fog continued plentiful from Cape Hatteras to the fortieth parallel, but the New England coast and the Maritime Provinces had less fog than usual for the month of February.

Contrary to what might be expected at this season of the year, remarkably little fog was reported near the Grand Banks during the month.

Fog is seldom noted over Caribbean waters; however, two instances were reported this month. Fog was observed on February 7 off False Cape, northeastern Honduras, near latitude 15.5° N. and longitude 83° W. On the following day a vessel reported fog off the coast of Nicaragua, at approximately 100 miles to the southward of the position aforementioned.

OCEAN GALES AND STORMS, FEBRUARY 1940

Vessel	Voyage		Position at time of lowest barometer		Gale began February	Time of lowest barometer	Gale ended February	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH ATLANTIC OCEAN			° ′	° ′				*Millibars*					
Exmoor, Am. S. S.	Lisbon	New York	35 35 N.	42 00 W.	1	4p, 1	2	988.5	SSW	WSW, 10	W	W, 10	SW-W.
Explorer, Am. S. S.	Casablanca	do	34 00 N.	36 00 W.	1	8p, 1	2	996.3	SSW	SSW, 9	W	WSW, 10	SSW-SW.
West Kebar, Am. S. S.	Dakar	do	34 30 N.	64 18 W.	2	4a, 3	4	985.1	SSW	W, 10	NW	W, 10	SW-NW.
Exmouth, Am. S. S.	Casablanca	do	36 00 N.	62 54 W.	3	7a, 3	4	983.7	SSW	SW, 9	NNW	W, 12	SW-W.
Black Tern, Am. S. S.	Durban	Baltimore	35 12 N.	66 48 W.	3	5a, 3	4	985.4	W	NW, 10	NW	NW, 10	WSW-NW.
Explorer, Am. S. S.	Casablanca	New York	34 06 N.	45 36 W.	3	3a, 4	5	992.6	S	WSW, 10	NW	W, 10	S-WSW-SSW.
Exmoor, Am. S. S.	Lisbon	do	35 25 N.	46 38 W.	3	4a, 4	5	989.5	SSW	SSW, 10	NW	WSW, 10	SSW-WSW.
Breedyk, Du. S. S.	Antwerp	do	[1] 48 39 N.	[1] 25 11 W.	5	2p, 5	5	973.7	S	WSW, 10	WSW	WSW, 10	SSW-WSW.
Tennessee, Dan. S. S.	Copenhagen	do	[1] 57 57 N.	[1] 18 48 W.	5	12p, 5	6	979.4	W	S, 10	NW	SSE, 11	SSE-SSW.
Breedyk, Du. S. S.	Antwerp	do	45 48 N.	38 42 W.	8	10p, 8	11	977.6	WSW	WSW, 10	WNW	W, 11	SSW-WSW.
Soesterberg, Du. S. S.	New Orleans	Rotterdam	38 34 N.	57 50 W.	8	12a, 8	8	998.0	SSW	W, 9	NW	WNW, 10	SW-WNW.
Tennessee, Dan. S. S.	Copenhagen	New York	53 10 N.	35 00 W.	9	10p, 9	10	958.7	S	S, 9	SW	W, 12	S-W.
Boschdyk, Du. S. S.	Antwerp	do	[1] 48 27 N.	[1] 28 14 W.	9	8a, 9	10	976.5	S	S, 8	SW	SW, 10	S-WSW.
Soesterberg, Du. S. S.	New Orleans	Rotterdam	40 00 N.	46 30 W.	10	2a, 10	10	998.0	WNW	NNW, 8	WNW	W, 10	
Boschdyk, Du. S. S.	Antwerp	New York	[1] 47 50 N.	[1] 31 59 W.	10	4p, 10	10	979.1	SW	WSW, 10	W	S, 10	S-W.
West Irmo, Am. S. S.	Dakar	Norfolk	33 19 N.	71 04 W.	11	9a, 11	11	1,004.7	SW	WSW, 9	W	W, 10	SW-W.
Exeter, Am. S. S.	Gibraltar	New York	37 42 N.	52 30 W.	11	12p, 11	12	994.2	S	S, 9		W, 10	SSE-SW.
Cities Service Koolmotor, Am. S. S.	Boston	Port Arthur	40 18 N.	69 24 W.	11	12p, 11	11	981.0	SW	SW, 8	WNW	WNW, 10	SW-WNW.
Extavia, Am. S. S.	Gibraltar	New York	34 24 N.	63 42 W.	11	4p, 11	11	1,004.4	SSW	SSW, 8	W	W, 11	SSW-W.
Washington, Am. S. S.	New York	Gibraltar	40 00 N.	58 12 W.	11	2a, 12	13	986.5	SW	WNW, 8	SW	W, 10	SW-WNW.
President Harrison, Am. S. S.	Gibraltar	New York	43 12 N.	44 18 W.	12	6a, 13	13	993.9	SSE	W, 7	WSW	W, 10	WSW-W.
Santa Barbara, Am. M. S.	Cristobal	do	40 10 N.	73 50 W.	14	3p, 14	14	971.6	ENE	NE, 10	NE	NE, 10	ENE-NE.
Cities Service Koolmotor, Am. S. S.	Boston	Port Arthur	33 18 N.	74 00 W.	14	8a, 14	15	992.9	SSW	WSW, 10	NW	W, 11	SSW-W.
Gulfking, Am. S. S.	Portland, Maine.	do	34 42 N.	75 12 W.	14	10a, 14	15	988.8	WSW	WSW, 8	NW	WNW, 11	SW-W.
T. C. McCobb, Am. S. S.	Baytown, Tex.	New York	35 46 N.	74 08 W.	14	1p, 14	15	984.4	W	W, 10	NW	W, 10	
Carrabulle, Am. S. S.	Cienfuegos	Wilmington, Del.	34 00 N.	74 30 W.	14	4p, 14	15	[2]1,001.0	WSW	W, 10	NNW	WNW, 11	W-WNW.
Chelan, U. S. C. G.	On patrol out from Boston.		42 07 N.	69 47 W.	14	9p, 14	15	975.6	E	ENE, 12	N	ENE, 12	ENE-NE.
Labette, Am. S. S.	Boston	Baltimore	39 54 N.	71 00 W.	14	10p, 14	16	972.9	ENE	NNE, 12	NNW	NNE, 12	NNE-N.
F. W. Abrams, Am. S. S.	Texas City	Boston	38 00 N.	72 00 W.	14	10p, 14	15	968.5	W	NW, 11	NW	NW, 11	W-NW.
E. M. Clark, Am. S. S.	Boston	Texas City	38 36 N.	69 12 W.	14	11p, 14	15	963.8	SW	W, 8	WNW	WNW, 11	WSW-WNW.
San Bruno, Pan. S. S.	Charleston	Boston	40 05 N.	70 05 W.	14	5p, 14	15	967.2	E	NE, 5	N	N, 10	E-NE-NW.
Excello, Am. S. S.	Gibraltar	New York	34 48 N.	62 00 W.	14	1p, 15	18	986.1	S	WSW, 12	NW	WSW, 12	W-WSW-NW.
Executive, Am. S. S.	Lisbon	do	[1] 36 54 N.	[1] 43 25 W.	16	6a, 17	16	989.5	S	SW, 7	SW	S, 10	S-W.
Seatrain New York, Am. S. S.	Habana	do	[1] 38 09 N.	[1] 73 14 W.	18	12p, 19	18	996.6	ESE	SW, 3	S	SSE, 11	
O. M. Bernuth, Am. S. S.	Savannah	Baltimore	36 06 N.	75 24 W.	18	1p, 19	19	1,001.7	ESE	SW, 2	SW	SE, 10	
West Portal, Am. S. S.	Cristobal	New York	[1] 35 17 N.	[1] 75 12 W.	18	4p, 19	19	1,001.7	SE	S, 1	W	SE, 10	W-S.
Gulfpoint, Am. S. S.	Port Arthur	Providence, R. I.	37 00 N.	72 50 W.		7p, 14	15	978.0		W, 10	NNW	W, 10	
Bibb, U. S. C. G.	On station No. 1 out from Norfolk.		35 36 N.	53 18 W.	26	4a, 27	28	1,000.0	SE	S, 7	NW	SSE, 10	SSE-SW.
Exilona, Am. S. S.	Gibraltar	New York	36 42 N.	68 30 W.	28	7p, 28	28	1,002.0	SW	NW, 6	NW	SSW, 11	SSW-NW.
NORTH PACIFIC OCEAN													
Haida, U. S. C. G.	Juneau	Amchitka Isd.	[1] 52 05 N.	[1] 178 45 W.	1	8a, 1	1	998.3	NE	NE, 6	NE	NE, 8	
Makiki, Am. S. S.	Seattle	Honolulu	35 07 N.	142 09 W.	2	3a, 2	2	996.6	SW	SW, 6	W	W, 9	
Bahrein, Pan. S. S.	Los Angeles	Vladivostok	36 44 N.	169 59 W.	3	5p, 3	4	[2]990.5	WNW	W, —	NNW	NW, 8	W-WNW.
Makiki, Am. S. S.	Seattle	Honolulu	31 39 N.	147 05 W.	3	6a, 4	4	1,003.1	SSW	S, 9	S	S, 9	S-SW.
Collingsworth, Am. S. S.	do	Shanghai	41 29 N.	140 30 E.	3	7a, 4	5	[2]999.0	NE	WSW, 7	NW	NW, 10	None.
Bahrein, Pan. S. S.	Los Angeles	Vladivostok	[1] 37 49 N.	[1] 179 31 W.	4	5a, 6	8	[2]990.5	S	WSW, 8	WNW	SSW, 10	SW-W.
Manoeran, Du. M. S.	Manila	Los Angeles	39 40 N.	154 09 E.	3	4p, 4	6	968.9	SE	W, 11	NW	NW, 11	WSW-WNW.
Teiyo Maru, Jap. M. S.	Los Angeles	Kobe	31 24 N.	179 30 W.	6	12-02a, 5	7	999.0	W	SSW, 7	NW	W, 8	
Kentucky, Am. S. S.	Longview, Wash.	Los Angeles	43 10 N.	124 30 W.	5	12p, 5	6	1,007.8	S	S, 10	SW	S, 10	S-SW.
Dirigo, Am. S. S.	Los Angeles	Seattle	45 48 N.	124 48 W.	6	4p, 6		1,008.5		W, 5		SSW, 8	
Collingsworth, Am. S. S.	Seattle	Shanghai	35 30 N.	130 40 E.	7	6p, 6	8	1,013.5	NW	NNE, 4	NW	NW, 10	NNE-NW.
Bahrein, Pan. S. S.	Los Angeles	Vladivostok	39 00 N.	170 48 E.	9	4p, 10	11	[2]987.8	WSW	WSW, 9	WN	W, 11	
Dirigo, Am. S. S.	Astoria	Los Angeles	44 00 N.	124 36 W.	12	4p, 12	12	1,005.8		S, 10		S, 10	
Nordbo, Dan. M. S.	Osaka	San Francisco	[1] 38 40 N.	[1] 148 21 E.	14	6p, 14	15	993.6	W	W, 7	NW	WNW, 9	
Bahrein Pan. S. S.	Los Angeles	Vladivostok	40 30 N.	151 48 E.	15	4a, 15	15	[2]982.1	SW	W, 12	NW	W, 12	SW-NW.
Taranger, Nor. M. S.	Kobe	Portland, Oreg.	40 32 N.	150 50 E.	14	4a, 15	15	980.7	ESE	NW, 11	WNW	NW, 12	SW-NW.
Illinois, Am. S. S.	Osaka	do	44 28 N.	177 00 E.	15	2p, 16	17	987.5	SSE	SW, 8	SW	S, 9	SW-WSW.
San Diego Maru, Jap. M. S.	Yokohama	San Francisco	42 30 N.	176 48 E.	16	11p, 16	17	998.0	W	W, 8	W	W, 9	
Nordbo, Dan. M. S.	Osaka	do	38 00 N.	164 18 E.	16	11p, 17	17	1,005.4	WNW	NW, 5	WNW	WNW, 9	
Illinois, Am. S. S.	do	Portland, Oreg.	47 11 N.	170 36 W.	17	4a, 18	18	976.0	ESE	SSE, 8	WSW	SW, 10	E-SSE-SW.
Makiki, Am. S. S.	Hilo, T. H.	San Francisco	30 12 N.	140 00 W.	19	3p, 20	20	987.1	NNW	ENE, 5	NW	NW, 8	NE-SE.
Pennsylvanian, Am. S. S.	Balboa	Los Angeles	15 42 N.	94 46 W.	18	6p, 18	18	1,007.5	WNW	NW, 7	N	NNW, 8	NW-NNW.
Malama, Am. S. S.	Kahului, T. H.	San Francisco	27 36 N.	146 30 W.	20	8p, 20	20	999.3		WNW, 6		NW, 8	NW-WNW-NNW.
Taranger, Nor. M. S.	Kobe	Portland, Oreg.	[1] 42 53 N.	[1] 179 22 W.	20	4p, 19	21	964.7	ESE	Var, 4	W	E, 12	S-Var.-W.
Nordbo, Dan. M. S.	Osaka	San Francisco	[1] 38 02 N.	[1] 175 07 E.	19	4a, 20	21	975.2	SSE	SSW, 9	WNW	SSW, 9	SE-SW.
San Diego Maru, Jap. M. S.	Yokohama	do	[1] 42 53 N.	[1] 160 28 W.	19	10a, 20	20	993.3	SSE	SE, 9	SSE	SE, 9	SE-SSE.
Daiiti Ogura Maru, Jap. M. S.	Nagasaki	Los Angeles	38 30 N.	174 36 W.	20	12a, 20	21	988.2		WNW, 9	NW	NW, 9	
Shickshinny, Am. S. S.	San Francisco	Balboa	13 15 N.	95 18 W.	20	4p, 21	21	1,011.5	ENE	NNE, 8	NNE	NNE, 8	
Kaizyo Maru, Jap. M. S.	Dairen	Los Angeles	42 42 N.	167 30 E.	21	5p, 21	21	982.1	SE	SE, 8	SSW	SE, 8	SE-SW.
Texmar, Am. S. S.	Bradwood, Oreg.	Balboa	[1] 15 04 N.	[1] 95 51 W.	21	4p, 21	23	1,012.5	NE	N, 8	NE	N, 9	NE-N.
Vega, U. S. S.	San Diego	do	14 18 N.	96 00 W.	21	4p, 21	22	1,008.8	ENE	NNE, 7	N	N, 8	ENE-NNE.
Olopana, Am. S. S.	Balboa	San Diego, Calif.	9 06 N.	84 48 W.	22	4p, 22	23	1,007.5	NNE	NNE, 2	ENE	NNE, 9	None.
Taranger, Nor. M. S.	Kobe	Portland, Oreg.	44 12 N.	152 00 W.	24	8p, 24	25		ESE	E, 9		E, 9	
Olopana, Am. S. S.	Balboa	San Diego, Calif.	15 06 N.	94 36 W.	25	4p, 25	26	1,011.9	NW	NW, 7		NNE, 9	None.
Illinois, Am. S. S.	Osaka	Portland, Oreg.	49 38 N.	140 40 W.	25	8a, 26	26	984.1	ESE	E, 6	E	ESE, 8	E-ENE.

[1] Position approximate.

[2] Barometer uncorrected.

OCEAN GALES AND STORMS, FEBRUARY 1940—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began February	Time of lowest barometer	Gale ended February	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—Con.								*Millibars*					
Mauna Ala, Am. S. S.	Seattle	Honolulu	[1] 27 49 N.	[1] 151 41 W.	26	4p, 25	27	1,001.7	W	W, 5	N	WNW, 9	SW-W.
Arizonan, Am. S. S.	Los Angeles	Balboa	15 30 N.	96 36 W.	25	5p, 25	26	1,013.9	NE	W, 3	NW	N, 8	
Makawell, Am. S. S.	San Francisco	Honolulu	28 34 N.	145 35 W.	26	4p, 26	27	1,000.0	WSW	WSW, 7	WSW	W, 8	SW-WSW.
President Adams, Am. S. S.	do	do	28 54 N.	144 42 W.	26	4p, 26	27	1,000.7	SW	SW, 8	WNW	W, 9	SW-W.
Nordbo, Dan. M. S.	Osaka	San Francisco	36 36 N.	148 42 W.	27	4a, 27	27	989.8	W	W, 7	WNW	WNW, 9	W-WNW.
Huguenot, Am. S. S.	Los Angeles	Seattle	43 27 N.	125 06 W.	27	6a, 27	27	992.9	S	SW, 10	W	SW, 10	S-W.
Lexa Maersk, Dan. M. S.	Yokohama	Los Angeles	41 01 N.	156 07 E.	26	12m, 27	28	980.7	NW	WNW, 10	NW	WNW, 10	
Sirius, U. S. S.	Alameda, Calif.	Pearl Harbor, T. H.	35 30 N.	127 24 W.	27	3p, 27	28	1,002.7	S	S, 8	S	S, 8	
Taranger, Nor. M. S.	Kobe	Portland, Oreg.	45 07 N.	134 06 W.	27	12m, 27	27	968.7	ENE	NE, 3	NE	NE, 11	NE-WSW.
Illinois, Am. S. S.	Osaka	do	48 02 N.	135 17 W.	27	6a, 28	28	976.0	NE	NE, 8	NNW	NE, 8	NE-N.
Kaimoku, Am. S. S.	Portland, Oreg.	Honolulu	44 31 N.	128 40 W.	28	12m, 28	28	984.4	SE	SSE, 9	SW	S, 10	SSE-S.

[1] Position approximate.

NORTH PACIFIC OCEAN, FEBRUARY 1940

By WILLIS E. HURD

Atmospheric pressure.—A great low-pressure area lay over most of the northern part of the ocean, broken by only a few days of intruding anticyclonic conditions. The average center of the Aleutian LOW lay near Dutch Harbor, where the month's pressure, 994.3 millibars (29.36 inches), was 8.1 millibars (0.24 inch) below the February normal. Subnormal pressures occurred elsewhere throughout middle and northern latitudes.

In lower latitudes of the Far East pressures were for the most part above normal, with the continental anticyclone extending eastward across the island groups between the Philippines and Japan. A shallow anticyclone, much less than normal in extent, lay between California and the Hawaiian Islands.

TABLE 1.—*Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, February 1940, at selected stations*

Stations	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Millibars	*Millibars*	*Millibars*		*Millibars*	
Point Barrow	1,025.3	+5.3	1,050	22	999	29
Dutch Harbor	994.3	−8.1	1,010	15	971	29
St. Paul	1,000.2	−3.9	1,018	15	977	29
Kodiak	1,002.2	−.9	1,033	21	976	12
Juneau	1,010.2	−3.0	1,037	20	988	8
Tatoosh Island	1,010.2	−5.7	1,032	20	990	26
San Francisco	1,017.6	−1.7	1,027	29	1,006	28
Mazatlan	1,013.5	0	1,017	9	1,010	14
Honolulu	1,015.2	−2.4	1,020	27	1,010	21
Midway Island	1,014.8	−.8	1,023	14, 26	1,003	29
Guam	1,012.8	−.1	1,016	11–14	1,008	23
Manila	1,014.4	+2.2	1,018	9, 14	1,012	2, 6, 26–28
Hong Kong	1,017.0	−0.6	1,025	15	1,011	28
Naha	1,020.5	+2.9	1,026	15	1,012	1
Titijima	1,019.4	+4.2	1,029	15	1,009	7
Petropavlovsk [1]	1,004.3	−.8	1,023	2	978	22

[1] For 18 days.

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

Extratropical cyclones and gales.—The month opened with a cyclone of almost ocean-wide extent in northern and middle latitudes, accompanied by scattered gales of force 8 to 10 on the 1st to 4th between Midway Island and the Aleutians, and to the northeastward of the Hawaiian Islands. Thereafter numerous smaller, but in some instances more violent, cyclones continued until the end of February.

Considerably more than half of the storminess reported occurred between latitudes 35° and 45° N. An unusually small number of gale winds for the month was reported from the northernmost steamer route. In southeastern waters gales of force 8 to 9 occurred on 8 days, concentrated largely between about latitudes 25° and 36° N., longitudes 135° and 155° W.

In coastal waters of the United States there were whole southerly gales (force 10) on several days, caused by storms central for the most part at some distance oceanward. Ships encountered the greater number of these gales on the 5th, 6th, 12th, 27th, and 28th, off the coasts of Oregon and northern California. Some 10° west of the Oregon coast, near 45° N., 134° W., the Norwegian motorship *Taranger* experienced the strongest gale of the month on the eastern half of the Pacific. It was of force 11 from the northeast on the 27th, lowest barometer 968.8 millibars (28.61 inches).

In central and western waters of the ocean gales of force 11 to 12 occurred on the 5th and 15th near 40° N., 150°–155° E.; on the 9th near 39° N., 171° E.; and on the 20th near 43° N., 179° W. That of the 20th was of hurricane force from the east, encountered by the motorship *Taranger*. The ship's lowest barometer was 964.8 millibars (28.49 inches), which was the lowest reading of the month.

Gales of low latitudes.—These winds, so far as known, were confined to the west coasts of Mexico and lower Central America. During the night of the 17th–18th the prevailing northwesterly wind south of Cape Corrientes rose to force 7. In the Gulf of Tehuantepec northerly gales of force 8 occurred on the 18th, 22d, and 26th; and of force 9, on the 21st and 25th. Off the coast of Costa Rica there was a papagayo of force 9 from north-northeast on the 23d.

Fog.—Scattered fogs occurred over a wide extent of the ocean in west longitudes: Near the eastern Aleutians on the 7th to 9th; in and near the Gulf of Alaska on the 1st to 3d and the 11th; a day or two out from California on six dates; off the California coast on 6 days; off Lower California on 3 days; off Mexico on 4 days; and south of Panama on 2 days.

CLIMATOLOGICAL TABLES

CONDENSED CLIMATOLOGICAL SUMMARY

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

TABLE 1.—*Condensed climatological summary of temperature and precipitation by sections, February 1940*

[For description of tables and charts, see REVIEW, pp. 32 and 38, January 1940]

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	45.8	−3.1	Robertsdale	82	29	Valley Head	10	3	6.89	+1.68	River Falls	12.70	Addison	4.34
Arizona	45.9	.0	Casa Grande Ruins	93	29	Alpine	−7	13	1.86	+.52	Junipine	6.02	Mohawk	.13
Arkansas	41.9	−1.7	Arkadelphia	88	29	Lead Hill	10	14	3.31	−.11	Wynne	6.19	Mountain Home	.84
California	48.5	+.5	Blythe	86	28	Ellery Lake	−8	18	8.44	+3.88	Inskip	32.71	Blythe	.42
Colorado	28.7	+1.6	Lamar	79	28	2 stations	−31	1 13	1.27	+.28	Wolf Creek Pass	8.76	2 stations	.04
Florida	58.7	−4.0	West Palm Beach	88	11	Mason	19	1	4.56	+1.40	Compass Lake	8.54	Tavernier	1.25
Georgia	46.2	−2.5	Alapaha	81	29	2 stations	12	1 1	5.34	+.41	Blakely	10.62	Douglas	3.14
Idaho	32.8	+4.8	Emmett	71	28	Island Park Dam	−27	16	3.56	+1.79	Deception Creek	11.21	May	.56
Illinois	30.9	+1.1	2 stations	58	1 11	Dixon	−13	25	1.61	−.32	Brookport	5.54	Morris	.49
Indiana	31.6	+1.0	do	60	1 8	2 stations	−2	25	2.59	+.15	Scottsburg	6.13	Winamac	.82
Iowa	24.2	+1.9	do	56	29	do	−27	25	1.18	+.08	Mount Ayr	2.24	Onawa	.41
Kansas	33.8	+.8	3 stations	79	29	Horton	−5	10	.93	−.07	Marion	2.19	Bird City	.15
Kentucky	36.1	−1.0	Heidelberg	68	10	Farmers	2	1 3	4.56	+1.10	Lovelaceville	6.09	Grant	2.50
Louisiana	51.2	−2.6	Leesville (near)	88	28	Franklinton	19	1	7.15	+2.56	Morgan City	14.74	Plain Dealing	2.48
Maryland-Delaware	34.2	+1.1	3 stations	66	12	Oakland, Md	−4	16	2.91	−.19	Emmitsburg, Md	4.58	Luke, Md	1.83
Michigan	23.1	+2.9	2 stations	44	1 3	Watersmeet	−27	9	1.16	−.48	Detour	2.62	Lowell	.36
Minnesota	17.2	+4.8	4 stations	50	10	Pokegama Falls	−33	25	.81	+.05	Isle	2.16	Artichoke Lake	.28
Mississippi	45.8	−3.7	2 stations	83	1 28	Tupelo	14	1	6.27	+1.34	Poplarville	11.26	Moorhead	2.60
Missouri	33.5	+.4	Garber	78	29	Grant City	−11	10	1.59	−.49	Sikeston	6.84	Louisiana	.17
Montana	24.7	+2.7	Bridger	63	29	Outlook	−31	24	1.43	+.65	Heron	6.43	East Helena	.13
Nebraska	27.9	+1.7	Haigler	73	27	Niobrara	−18	9	.60	−.10	Auburn	2.30	Arthur	.02
Nevada	38.0	+4.2	Overton	83	28	Marlette Lake	−8	19	1.62	+.55	Marlette Lake	10.10	Mina	.05
New England	23.7	+1.1	Orona, Maine	56	18	First Conn. Lake, N. H.	−32	27	3.19	+.07	2 stations	7.47	RipogenusDam, Maine	.73
New Jersey	31.9	+1.3	Hammonton	62	12	Layton	−1	27	3.03	−.52	Lakewood	4.52	Layton	1.78
New Mexico	36.2	−1.0	Logan	88	28	Eagle Nest	−36	9	1.19	+.46	Willow Creek, R. S.	4.25	2 stations	T
New York	22.8	+.3	Glenham	58	12	Stillwater Reservoir	−25	26	3.12	+.41	Penn Yan	6.87	Messena	.68
North Carolina	41.9	−.9	Goldsboro	74	6	Mount Mitchell	−2	3	3.50	−.57	Highlands	6.67	Morganton	1.80
North Dakota	15.0	+5.4	3 stations	52	10	Sanish	−20	24	.61	+.14	Mohall	1.27	Fort Yates	.10
Ohio	29.8	+.4	2 stations	67	10	2 stations	−7	15	3.17	+.53	Wilmington	5.52	Bowling Green	.97
Oklahoma	41.4	+.4	3 stations	88	27	do	11	13	2.19	+.80	Perkins	4.75	Goodwell	.39
Oregon	38.6	+3.4	Hay Creek	72	16	Chemult	−11	20	6.50	+3.27	Valsetz	31.42	Redmond	.79
Pennsylvania	29.4	+1.0	Waynesburg	63	10	Coudersport	−19	26	3.16	+.28	Zionsville	5.58	Millville	1.13
South Carolina	45.8	−1.8	Beaufort (near)	76	28	Caesars Head	14	3	4.50	+.22	Georgetown	8.12	Landrum	2.82
South Dakota	21.0	+2.0	Ardmore	68	29	Aberdeen	−26	24	.62	+.06	Pukwana	1.73	Belle Fourche	.07
Tennessee	39.4	−1.9	Loudon	74	11	Gatlinburg	4	3	5.18	+.77	Monteagle	9.10	Kingsport	2.26
Texas	50.1	−1.2	Falfurrias	102	28	Muleshoe	7	1 13	2.38	+.60	Nacogdoches	8.09	2 stations	.10
Utah	33.1	+3.2	St. George	72	28	Woodruff	−14	21	2.19	+.89	Mount Baldy Ranger station.	7.15	Hanksville	.15
Virginia	37.2	−.1	Clarksville	70	13	Big Meadows	−4	3	2.62	−.51	Onley	4.88	Radford	1.38
Washington	38.1	+3.8	2 stations	67	1 1	2 stations	−1	2	7.31	+3.53	Cougar (near)	31.11	Coupeville	1.85
West Virginia	33.5	+.1	Brownsville	73	12	Pickens	−6	26	3.84	+.66	Pickens No. 2	7.36	Brandywine	.95
Wisconsin	21.1	+4.1	Wisconsin Rapids	48	19	Hatfield	−38	25	1.05	−.17	Rest Lake	2.73	Hancock	.32
Wyoming	24.9	+2.8	Dull Center	74	29	3 stations	−29	1 13	.98	+.20	Bechler River	10.23	Rochelle	T
Alaska (January)	12.9	+11.0	Craig	62	13	Allakaket	−56	30	2.64	+.50	Latouche	20.20	Barrow	.10
Hawaii	69.9	+1.2	2 stations	89	1 5	Kanalohuluhulu	35	28	4.04	−3.48	Kukui	26.00	Puako	T
Puerto Rico	73.6	+1.1	do	93	1 20	Guineo Reservoir	50	5	4.63	+.53	La Mina (El Yunque).	25.56	Mona Island (Lighthouse).	.00

See footnotes at end of table.

TABLE 2.—*Climatological data for Weather Bureau stations, February 1940*

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01, inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
	Ft.	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	°*F.*	°*F.*	°*F.*		°*F.*	°*F.*		°*F.*	°*F.*	°*F.*	°*F.*	%	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*
New England							26.5	+1.2										76	3.15	−0.2							6.1					
Eastport	76	67	85	29.77	29.86	−0.12	24.0	+2.5	42	18	30	6	27	18	19	22	17	73	1.77	−1.7	5	13.0	nw.	38	nc.	15	11	5	13	5.7	18.4	8.5
Greenville, Maine	1,069	4	41																												
Portland, Maine	103	82	117	29.79	29.91	−.11	27.1	+3.3	43	18	34	8	27	20	22	23	16	67	4.57	+.4	14	8.9	n.	33	nc.	14	14	5	10	4.7	20.9	8.7
Concord	288	54	72	29.60	29.93	−.11	25.2	+2.4	44	18	34	−3	23	16	39	18	15	83	2.77	−.2	12	6.7	nw.	22	nw.	15	13	6	10	5.2	22.4	9.5
Burlington	403	11	48	29.53	30.00	−.03	17.2	−2.2	37	7	26	−11	27	8	32	15	11	80	1.48	−.2	11	7.6	n.	26	nw.	25	3	8	18	7.5	14.1	5.0
Northfield	876	12	60	28.98	29.98	−.06	16.3	−.1	41	7	28	−21	27	5	43	14	11	84	1.51	−.8	8	7.1	n.	27	nc.	14	6	10	13	6.8	13.4	17.2
Boston [1]	29	33	62	29.86	29.90	−.14	29.6	+.8	47	12	36	10	27	23	25	25	20	70	4.78	+1.4	12	12.7	nw.	51	nc.	14	8	8	13	6.2	23.8	5.5
Nantucket	12	14	90	29.85	29.87	−.17	32.0	+1.3	51	11	36	19	27	27	17	29	26	81	5.22	+1.7	14	15.1	n.	51	nc.	14	6	9	14	6.7	5.4	T
Block Island	26	11	46	29.86	29.89	−.17	31.9	+1.5	48	7	37	15	27	27	19	29	24	74	2.92	−.9	12	18.2	n.	50	nc.	14	11	8	10	5.4	2.6	T
Providence	159	215	251	29.84	29.91	−.14	30.0	+1.0	49	12	37	9	27	23	22	26	21	74	3.13	−.6	12	13.3	nw.	47	nw.	11	9	9	11	5.7	17.1	3.2
Hartford	159	66	100	29.90	29.92	−.14	27.7	+.5	49	12	36	3	27	19	37	24	19	76	3.09	−.9	11	9.5	n.	32	n.	14	6	8	15	6.7	16.9	5.6
New Haven	106	74	153	29.86	29.93	−.14	30.8	+1.9	47	12	37	12	27	24	20	26	22	75	3.45	−.7	11	10.7	n.	42	n.	14	6	11	12	6.0	10.9	T
Middle Atlantic States							34.1	+0.9										72	2.91	−0.3									6.3		
Albany [1]	292	26	40	29.63	29.96	−.11	21.8	−2.3	40	7	30	−13	27	13	33	19	14	74	2.83	+.3	12	10.2	n.	36	nw.	11	5	6	18	7.2	23.2	5.8
Binghamton	871	57	79	29.02	29.98	−.10	25.4	+1.4	54	12	34	−6	27	17	31	22	19	79	3.79	+1.6	15	6.7	nw.	20	ne.	14	3	4	22	8.1	25.3	10.5
New York	314	415	454	29.60	29.92	−.16	33.0	+1.7	54	12	40	15	26	26	23	29	22	65	3.33	−.6	11	16.5	n.	53	nw.	11	8	8	13	6.1	8.8	.0
Harrisburg [1]	351	30	49	29.58	29.97	−.12	32.3	+2.1	58	12	39	14	3	25	31	29	23	72	3.09	.0	10	9.4	nw.	32	n.	14	8	4	17	6.6	13.7	T
Philadelphia	114	174	367	29.82	29.95	−.15	34.8	+.9	57	12	42	15	3	28	25	30	24	66	2.90	−.5	11	14.4	nw.	42	nw.	15	8	8	13	5.8	11.7	T
Reading	353	283	306	29.61	29.98	.....	33.0	+4.2	59	12	40	13	3	26	26	29	23	67	2.88	−.7	12	12.5	nw.	43	e.	14	9	6	14	6.1	19.2	.6
Scranton	805	72	104	29.08	29.97	−.11	28.2	+.9	56	12	35	6	27	21	26	25	20	72	2.48	−.7	12	7.4	nw.	25	nw.	11	7	3	19	7.0	21.4	3.0
Atlantic City	52	37	172	29.88	29.94	−.17	34.5	+.9	50	13	41	13	3	28	23	31	26	73	3.51	.0	15	17.4	nw.	54	e.	19	9	7	13	6.1	4.6	.0
Sandy Hook	22	10	57	29.90	29.93	.....	32.3	+.2	50	12	38	16	3	27	19	29	26	80	2.31	−1.6	11	16.0	nw.	49	ne.	14	9	6	14	6.4	8.1	1.0
Trenton	190	89	107	29.73	29.94	.....	32.7	+2.0	59	12	40	13	3	26	28	29	23	69	2.94	−.5	13	10.2	nw.	28	nw.	14	8	7	14	6.4	11.4	.0
Baltimore [1]	123	100	215	29.95	29.97	−.14	37.4	+2.0	61	12	44	18	3	31	26	31	26	72	3.97	+.5	8	11.1	nw.	41	nw.	14	9	6	14	6.2	5.3	T
Washington	112	62	85	29.84	29.96	−.15	37.1	+1.8	64	12	44	16	1	30	33	32	24	61	2.77	−.1	11	8.4	nw.	34	nw.	14	9	5	15	6.2	4.3	.0
Cape Henry	18	8	54	29.93	29.95	.....	39.8	−1.4	66	12	47	20	1	33	25	36	32	78	2.90	−.4	12	13.1	n.	52	nw.	15	9	7	13	6.0	.8	.0
Lynchburg	686	144	184	29.23	29.99	−.12	40.4	+.1	66	13	50	17	1	31	32	34	26	64	3.02	−.2	10	8.2	nw.	36	nw.	15	10	7	12	6.0	T	.0
Norfolk	91	80	125	29.86	29.96	−.15	42.4	−.3	67	12	50	19	3	34	26	37	32	73	2.38	−1.0	13	10.5	n.	39	w.	14	8	6	15	6.7	1.0	.0
Richmond [1]	144	11	52	29.78	29.97	−.14	39.9	+.3	67	12	50	11	1	30	34	33	29	76	2.81	−.5	12	8.7	sw.	32	nw.	14	9	7	13	5.7	.5	.0
Wytheville	2,304	49	55	27.53	29.98	−.14	35.2	+.1	59	13	44	10	3	26	33	30	26	75	1.63	−1.4	10	8.0	w.	31	nw.	14	5	6	18	7.2	4.4	.0
South Atlantic States							46.4	−1.5										73	3.96	+0.3									6.4		
Asheville	2,253	89	104	27.61	30.03	−.10	38.8	+.3	66	12	49	13	3	29	40	33	28	74	2.61	−.7	13	10.4	nw.	34	nw.	2	2	8	19	8.0	3.0	.0
Charlotte [1]	779	63	86	29.15	29.99	−.13	43.8	−.1	66	16	53	21	3	35	28	37	31	71	3.60	−.7	12	8.0	sw.	32	nw.	14	5	9	15	6.8	T	.0
Greensboro [1]	886	6	56	29.03	30.00	.....	39.6	.....	65	13	50	10	3	29	34	34	29	74	2.24	.....	14	8.9	sw.	42	nw.	14	5	10	14	6.8	T	.0
Hatteras	11	5	50	29.96	29.97	−.14	43.6	−3.8	62	6	50	23	3	37	23	40	38	85	6.21	+2.0	11	14.4	n.	52	nw.	14	10	5	14	6.1	T	.0
Raleigh [1]	376	103	146	29.59	29.98	−.13	44.4	+1.2	68	13	54	17	3	35	31	38	32	72	2.52	−1.5	12	9.9	sw.	42	nw.	14	9	9	11	5.7	T	.0
Wilmington	72	73	107	29.92	30.00	−.12	47.1	−.8	69	6	56	19	3	38	29	41	36	71	5.69	+2.3	12	10.4	sw.	35	nw.	14	9	6	14	5.8	.0	.0
Charleston	48	11	92	29.97	30.02	−.10	48.8	−3.6	72	28	57	26	3	41	27	43	39	75	3.73	+.6	11	11.0	w.	42	e.	18	8	8	13	6.2	.0	.0
Columbia, S. C	347	70	91	29.77	30.01	−.10	46.8	−1.4	70	10	57	22	3	37	28	40	34	69	2.89	+1.0	11	9.5	sw.	30	e.	18	8	6	15	6.2	.0	.0
Greenville, S. C	1,040	70	78	28.88	29.99	.....	43.4	+.1	67	28	53	24	26	34	29	37	30	66	3.57	−1.6	15	8.1	sw.	27	e.	18	7	8	14	6.4	.0	.0
Augusta [1]	182	62	77	29.54	30.00	−.12	47.7	−2.2	73	10	58	24	3	37	33	40	34	67	3.77	−.5	12	7.0	nw.	25	nw.	14	7	5	17	6.7	.0	.0
Savannah [1]	65	73	152	29.97	30.03	−.09	51.4	−2.6	74	28	60	29	3	42	27	43	39	77	4.67	+1.4	8	12.5	w.	44	se.	18	9	5	15	6.2	.0	.0
Jacksonville	43	86	110	30.00	30.05	−.07	54.2	−3.8	75	28	63	31	3	45	28	47	42	72	4.28	+1.2	9	9.8	w.	30	w.	20	8	9	12	5.5	.0	.0
Florida Peninsula							62.9	−3.6										78	2.89	+0.9									4.0		
Key West [1]	21	10	64	30.03	30.04	−.03	66.2	−4.3	81	13	72	50	23	60	18	60	58	8	21.56	+.2	5	12.0	n.	31	nw.	7	12	13	4	3.9	.0	.0
Miami	25	124	168	30.02	30.04	−.06	64.4	−2.7	80	29	72	43	23	57	22	58	54	74	2.42	+.6	6	10.9	se.	32	se.	17	9	12	8	5.1	.0	.0
Tampa [1]	35	88	197	30.04	30.05	−.05	58.0	−3.9	79	9	67	37	23	49	30	51	48	79	4.69	+2.0	9	12.8	nw.	37	se.	17	10	11	5	4.1	.0	.0
East Gulf States							47.9	−4.0										78	6.44	+1.5									7.2		
Atlanta [1]	976	5	72	28.96	30.02	−.10	42.0	−3.3	68	28	51	20	3	33	31	37	32	73	3.83	−1.0	14	12.2	nw.	40	e.	17	7	4	18	7.0	T	.0
Macon [1]	370	79	87	29.52	30.02	−.10	46.6	−2.7	74	10	56	25	1	37	33	40	35	73	4.96	+.4	13	8.3	nw.	29	nw.	14	6	3	20	7.3	.0	.0
Thomasville	273	49	58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Apalachicola	35	11	.....	30.01	30.04	.....	50.9	−5.4	72	28	58	32	3	44	24	47	44	81	6.58	+2.5	9	10.2	nw.	34	se.	17	6	2	21	7.1	.0	.0
Pensacola	56	149	185	29.98	30.04	−.07	50.6	−4.6	70	28	58	32	22	43	24	47	43	79	6.88	+2.4	11	9.5	w.	38	se.	17	8	8	13	6.1	.0	.0
Anniston	741	9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Birmingham [1]	630	5	55	29.36	30.04	−.08	44.0	−4.0	72	28	52	22	3	36	31	38	34	79	8.27	+3.0	14	9.0	nw.	30	e.	17	6	5	18	7.2	T	.0
Mobile	57	86	161	30.01	30.04	−.07	50.1	−4.6	75	29	59	29	1	42	32	45	42	83	5.56	.0	10	11.5	nw.	44	e.	17	5	8	16	7.0	.0	.0
Montgomery [1]	218	92	105	29.78	30.04	−.08	47.0	−4.6	74	28	55	28	3	39	28	41	37	78	5.48	−.2	12	8.5	w.	25	e.	17	4	7	18	7.8	.0	.0
Meridian [1]	375	67	92	29.70	30.03	−.08	46.7	−2.9	77	28	58	22	1	38	37	41	38	82	7.34	+1.8	11	7.8	s.	27	nw.	13	6	6	17	7.3	T	.0
Vicksburg	247	82	102	29.75	30.01	−.09	47.6	−4.2	81	29	56	29	14	40	32	42	37	70	7.08	+2.1	13	9.7	se.	24	e.	16	4	5	20	7.8	.0	.0
New Orleans [1]	53	76	84	30.00	30.03	−.06	53.5	−3.8	77	29	62	35	3	45	31	48	45	81	8.41	+4.0	9	7.4	se.	38	e.	16	6	10	13	6.2	.0	.0
West Gulf States							50.9	−1.0										76	2.61	0.0									6.1		
Shreveport [1]	249	92	227	29.81	30.00	−.09	49.2	−1.7	85	28	58	29	10	40	34	43	38	73	4.77	+1.4	11	13.1	nw.	29	ne.	16	8	7	14	6.6	.5	.0
Bentonville	1,303	12	51	.....	30.06	−.02	37.8	−.7	72	29	46	16	25	29	35	.....	.....	.....	1.27	−1.0	10	8.1	s.	22	sw.	11	6	5	18	.....	5.0	.0
Fort Smith	463	57	82	29.55	30.04	−.06	41.8	−1.0	75	28	50	23	14	33	42	.....	.....	.....	1.89	−.8	9	9.6	e.	25	sw.	11	6	5	18	.....	1.5	.0
Little Rock [1]	357	94	102	29.74	30.03	−.08	42.5	−2.4	76	28	50	25	14	35	35	38	34	79	3.21	−.8	13	9.5	nw.	27	sw.	27	7	6	16	6.8	3.0	.0
Austin [1]	605	68	90	29.35	30.01	.....	52.8	−.6	92	29	64	29	10	42	41	47	42	73	3.73	+1.3	8	8.6	nw.	25	sw.	7	9	8	12	5.8	T	.0
Brownsville [1]	57	88	96	29.97	29.99	.....	63.0	+.4	92	28	73	38	10	53	33	56	52	75	.35	−.9	6	13.3	se.	45	nw.	17	11	9	9	5.1	.0	.0
Corpus Christi [1]	20	11	78	29.95	30.00	−.05	59.3	+.9	94	28	68	37	10	51	34	53	49	79	1.10	−.4	6	12.2	s.	34	n.	9	9	10	10	5.6	T	.0
Dallas [1]	512	220	227	29.47	30.00	.....	47.6	.....	82	29	57	27	10	38	35	42	38	74	2.09	−.3	8	14.1	nw.	32	nw.	18	9	6	14	6.1	.1	.0
Fort Worth [1]	679	92	110	29.95	30.01	−.06	47.8	−.5	86	29	58	26	25	38	39	42	36	70	2.00	+.2	7	14.2	nw.	35	n.	20	12	5	12	5.2	T	.0
Galveston [1]	54	106	114	30.00	30.02	−.05	53.0	−3.3	70	24	58	34	10	48	27	48	45	83	3.02	+.1	10	12.5	s.	31	nw.	17	7	8	14	6.2	.0	.0
Houston [1]	138	157	190	29.95	30.02	.....	54.6	−1.3	90	28	63	32	10	46	32	48	44	78	3.18	−.1	10	12.1	nw.	31	nw.	5	8	7	14	6.3	.0	.0
Palestine	510	64	72	29.48	30.02	−.06	49.6	−1.6	83	28	58	26	10	41	31	44	38	71	3.56	+.4	10	9.3	s.	21	s.	26	7	6	16	6.7	T	.0
Port Arthur	34	59	134	29.98	30.02	.....	51.9	.....	73	24	59	31	10	45	28	.....	.....	.....	3.95	+.4	8	14.6	s.	43	e.	16	6	8	15	6.8	.0	.0
San Antonio [1]	693	111	301	29.39	30.01	−.04	56.0	+.6	94	28	67	33	9	45	35	49	43	71	1.86	+.1	10	12.9	n.	41	w.	17	9	6	14	5.7	T	.0

See footnotes at end of table.

TABLE 2.—*Climatological data for Weather Bureau Stations, February 1940*—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with 0.01 inch or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
Ohio Valley and Tennessee	*Ft.*	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	°F.	°F.	°F.		°F.	°F.		°F.	°F.	°F.	°F.	%	*In.*	*In.*		*Miles*								*0–10*	*In.*	*In.*
							35.1	−1.0										80	3.97	+0.5											7.8		
Chattanooga [2]	762	71	214	29.28	30.03	−0.10	41.6	−2.5	66	28	49	20	3	34	31	36	32	76	7.14	+2.1	13	8.7	ne.	34	w.	10	3	6	20	7.9	T	.0
Knoxville [1]	995	66	84	28.96	30.02	−.10	40.2	−1.7	64	13	48	17	3	32	30	35	30	76	3.47	−1.2	15	6.7	w.	22	ne.	18	6	8	15	6.9	T	.0
Memphis [2]	399	78	86	29.71	30.02	−.09	41.2	−3.1	68	28	48	26	3	34	28	37	34	80	4.71	+.2	14	8.6	nw.	25	w.	27	5	4	20	7.7	3.9	.0
Nashville [2]	546	168	188	29.36	30.02	−.10	39.7	−1.9	61	12	47	20	3	32	28	36	32	79	5.06	+.8	14	9.3	nw.	27	e.	17	6	3	20	7.7	.6	.0
Lexington	989	6					33.8	−1.6	59	12	41	10	3	26	28				4.68	+1.1	14										5.2	.0
Louisville [2]	525	106	120	29.42	30.02	−.08	35.3	−1.9	57	12	41	17	3	30	24	31	28	81	5.24	+1.6	14	9.1	sw.	28	sw.	27	6	4	19	7.4	9.3	.0
Evansville	431	76	116	29.55	30.04	−.07	35.3	−1.0	59	12	41	17	25	29	28	32	29	78	3.91	+.6	14	9.6	n.	28	sw.	27	3	4	22	8.4	1.8	.0
Indianapolis [2]	823	98	129	29.13	30.03	−.07	32.2	+1.1	47	11	38	15	2	27	25	28	26	85	2.38	−.4	15	8.6	nw.	21	n.	2	1	5	23	8.5	7.9	.0
Terre Haute	575	63	149	29.39	30.03		33.4		49	16	39	11	25	28	23	30	26	76	1.75	−1.0	16	10.3	nw.	26	nw.	13	1	6	22	8.7	7.7	.0
Cincinnati [2]	627	11	51	29.48	30.04	−.06	32.9	+.1	57	12	39	11	15	27	25	30	27	82	3.71	+.6	15	8.3	n.	21	nw.	14	4	4	21	8.0	10.1	.0
Columbus [2]	822	90	110	29.10	30.02	−.07	31.9	+1.2	55	12	38	11	3	26	27	28	25	83	2.98	+.2	14	9.6	s.	30	n.	2	6	4	19	7.6	10.4	1.0
Dayton	900	186	213	29.04	30.02		31.6	+.2	54	12	38	12	2	26	24	29	25	76	2.83	+.1	14	10.5	n.	32	w.	12	7	2	20	7.6	6.5	.0
Elkins [2]	1,947	65	83	27.84	30.01	−.09	31.8	+.2	60	12	41	3	26	23	35	27	24	83	4.55	+1.4	17	6.6	w.	31	se.	18	3	5	21	8.2	18.5	.0
Parkersburg	637	77	84	29.32	30.02	−.08	33.6	−.6	65	10	41	10	3	26	28	30	26	79	3.76	+.5	14	6.4	se.	25	nw.	6	5	7	17	7.6	13.7	.0
Pittsburgh [1]	1,273	39	54	28.60	30.00	−.09	29.8	−2.5	55	12	36	4	2	23	27	27	24	81	3.31	+.6	17	10.3	nw.	31	w.	6	5	6	18	7.4	22.7	T
Lower Lake Region							25.4	+0.3										85	2.76	+0.3										7.5		
Buffalo [2]	768	243	280	29.23	30.02	−.04	25.0	+.7	43	12	30	4	16	20	23	22	19	85	3.71	+.7	17	13.9	w.	45	w.	12	5	4	20	7.4	20.2	6.8
Canton	448	10	61	29.51	30.02		15.8	−2.2	37	6	25	−16	26	6	32	14	12	88	1.44	−.9	12	7.9	w.	29	e.	14	5	6	18	6.9	11.1	7.8
Ithaca	836	77	100	29.06	30.00		25.2	+.7	53	12	33	−1	27	17	31				3.25	+1.2	17	9.4	nw.	30	ne.	14	3	5	21	8.1	24.6	6.0
Oswego	335	71	85	29.63	30.01	−.05	23.4	−.5	41	6	30	1	27	17	27	21	16	74	2.91	+.1	16	10.6	n.	36	n.	14	5	4	20	7.3	21.7	20.0
Rochester [2]	523	86	102	29.39	30.02	−.04	24.8	+.2	40	10	30	6	27	19	23	21	18	84	3.08	+.3	16	8.6	w.	24	w.	11	5	3	21	7.8	23.0	9.4
Syracuse [2]	596	65	79	29.55	30.01	−.06	24.4	+.3	45	6	31	4	27	18	27	20	18	86	5.22	+2.4	17	7.4	nw.	21	n.	14	4	7	18	7.5	34.3	9.5
Erie	714	57	81	29.22	30.02	−.05	26.9	.0	49	12	32	7	2	22	17	25	23	86	3.12	+.5	19	7.9	n.	24	n.	14	4	8	17	7.4	16.3	4.0
Cleveland [2]	762	267	318	29.13	30.03	−.04	28.5	+1.1	51	12	34	8	2	23	19	25	23	86	3.24	+.7	19	13.6	w.	37	ne.	14	4	5	20	7.5	14.9	.7
Sandusky	629	8	67	29.33	30.03	−.04	28.2	+.8	45	12	34	11	2	23	23				2.68	+.5	18	9.3	sw.	22	w.	12	6	5	18	7.2	14.8	.7
Toledo [2]	628	79	87	29.34	30.04	−.03	27.8	+.5	43	12	33	9	2	23	23	25	23	83	1.73	−.4	14	10.4	w.	28	w.	12	7	3	19	7.1	9.6	.3
Fort Wayne	757	69	84	29.12	30.04		28.6	+1.0	41	12	34	6	2	24	22	26	23	85	1.41	−1.0	12	9.2	nw.	23	w.	12	4	3	22	8.2	11.2	T
Detroit [1]	626	5	78	29.35	30.05	−.01	29.7	+1.4	42	12	32	10	25	21	23	25	22	85	1.29	−1.0	15	10.0	ne.	29	w.	12	4	5	20	7.8	11.7	.5
Upper Lake Region							23.4	+4.7										81	1.02	−0.8										7.4		
Alpena	609	13	89	29.39	30.08	+.05	22.2	+4.2	36	3	29	4	14	15	25	20	17	80	.87	−.9	9	9.7	nw.	36	e.	12	4	8	17	7.3	11.0	2.6
Escanaba	612	51	72		30.11	+.05	21.2	+5.8	38	3	29	−2	26	13				84	1.23	−.3	8	10.0	n.	38	n.	1	5	6	18		19.3	13.8
Grand Rapids [2]	707	70	244	29.27	30.05	.00	27.1	+3.4	40	3	33	8	2	21	23	23	21	84	.77	−1.5	13	10.3	ne.	33	sw.	12	4	2	23	8.0	9.3	2.7
Lansing	878	5	90	29.07	30.04		24.6	+1.7	38	3	31	3	2	18	25	23	21	87	.82	−1.1	10	8.4	ne.	22	sw.	12	7	2	20	7.7	9.0	4.9
Marquette	734	44	69	29.27	30.10	+.05	23.1	+6.8	35	2	29	4	26	18	23	21	18	82	1.55	−.4	14	6.8	nw.	19	nw.	2	3	6	20	7.9	16.9	18.0
Sault Ste. Marie [1]	724	5	33	29.27	30.10	+.07	17.9	+5.5	39	18	27	−11	9	9	31	15	12	83	1.11	−.8	12	7.0	se.	24	nw.	3	7	7	15	6.7	13.0	16.7
Chicago	673	7	131	29.30	30.06	−.02	29.2	+2.9	42	11	34	5	25	24	23	27	23	77	.89	−1.3	11	10.7	ne.	28	ne.	1	4	7	18	7.9	12.9	1.6
Green Bay	617	109	141	29.38	30.08	+.02	22.8	+5.4	37	17	30	−9	25	16	28	21	16	74	.57	−1.0	6	9.7	n.	30	n.	18	7	3	19	7.5	6.6	7.4
Milwaukee [2]	681	97	221	29.29	30.08	+.02	27.4	+4.6	41	3	33	1	25	22	25	24	21	82	1.33	−.6	10	12.3	n.	32	n.	1	5	6	18	7.7	14.8	4.2
Duluth	1,133	5	47	28.82	30.10	+.02	18.6	+7.2	38	2	26	−9	24	12	28	17	14	81	1.07	.0	11	11.3	nw.	33	ne.	11	8	7	14	6.1	13.2	8.4
North Dakota							14.3	+6.5										89	0.69	+0.2										8.0		
Moorhead, Minn	940	50	58	29.12	30.14	+.03	15.2	+7.1	41	10	23	−16	25	8	38	14	12	88	.48	−.2	11	7.1	n.	22	n.	11	5	4	20	7.8	6.3	3.3
Bismarck [2]	1,677	8	57	28.28	30.14	+.02	16.0	+5.7	52	10	24	−17	24	8	39	15	14	91	.28	−.2	10	8.7	se.	27	se.	3	1	6	22	8.5	3.4	.6
Devils Lake	1,478	11	44	28.48	30.14	+.03	12.5	+7.4	39	10	29	−20	24	5	27	13	12	95	.83	+.3	10	7.5	se.	22	ne.	11	3	5	21	8.2	8.5	8.0
Grand Forks, N. Dak	832	12	67				13.1	+5.5	39	10	22	−16	24	4	30	13	9		1.08	+.5	8		nw.								10.8	11.1
Lemmon, S. Dak																																
Williston	1,878	42	50	28.03	30.11	.00	14.8	+6.7	46	10	23	−20	24	7	33	14	11	81	.80	+.4	12	6.2	se.	21	nw.	26	5	8	16	7.2	8.7	7.5
Upper Mississippi Valley							27.2	+2.3										81	1.35	−0.4										7.4		
Minneapolis, St. Paul, Minn	838	32	61	29.16	30.11	+0.02	19.4	+3.5	36	10	27	−17	25	12	33	18	15	81	.91	−.1	9	9.7	nw.	26	n.	12	6	6	17	7.1	9.1	5.2
Springfield, Minn	1,025	4	42				19.4		50	10	28	−18	25	11	37	18	15		.59		8	6.5	nw.							7.2		1.0
La Crosse [2]	714	11	48	29.34	30.10	+.02	23.9	+4.7	43	18	31	−15	25	17	33	20	17	82	.95	−.2	10	5.5	n.	17	nw.	12	7	2	20	7.1	10.3	2.5
Madison [2]	974	70	78	29.11	30.08	+.01	22.9	+3.8	40	17	29	−7	25	17	24	21	18	82	1.25	−.3	11	8.8	nw.	35	n.	19	4	7	18	7.4	12.3	9.7
Charles City	1,015	10	51	28.96	30.10	.00	21.7	+4.6	38	18	30	−21	25	14	35	20	17	83	1.33	+.2	11	6.4	n.	24	w.	12	5	9	15	6.7	12.7	2.5
Davenport	606	66	161	29.39	30.08	−.02	27.8	+2.9	44	11	34	−5	25	22	31	26	22	80	.95	−.7	13	9.4	ne.	30	nw.	12	6	6	17	7.3	8.1	.3
Des Moines [2]	860	5	99	28.99	30.06	−.05	25.4	+1.7	46	11	33	−9	10	18	42	23	21	86	1.80	+.6	10	9.6	n.	29	n.	23	6	3	20	7.5	12.7	T
Dubuque	699	60	79	29.30	30.08	−.01	25.4	+3.2	41	11	32	−7	25	19	34	24	20	78	1.11	−.3	9	6.8	nw.	19	ne.	18	6	5	18	7.2	9.9	1.3
Keokuk	614	64	78	29.38	30.06	−.05	29.2	+.9	50	29	35	−1	25	23	29	27	24	79	.72	−.9	9	7.7	n.	19	nw.	12	6	2	21	7.6	2.5	T
Cairo	358	87	93	29.64	30.03	−.09	36.8	−1.7	57	12	43	20	25	30	29	34	30	77	3.51	+.3	13	9.1	n.	24	s.	8	4	2	23	8.1	4.3	.0
Peoria [2]	609	11	45	29.32	30.06	−.07	29.4	+3.5	49	16	35	−4	25	24	26	26	24	85	.86	−1.2	11	7.4	n.	18	nw.	24	4	10	15	7.1	8.2	T
Springfield, Ill. [2]	636	5	191	29.36	30.04	−.06	31.0	+1.5	50	16	36	4	25	26	22	28	26	87	.80	−1.6	11	11.7	n.	27	se.	15	1	7	21	8.2	1.6	.0
St. Louis [2]	568	179	303	29.42	30.04	−.07	34.0	−.8	62	11	40	9	25	28	33	31	27	77	1.39	−1.2	12	11.7	nw.	29	se.	15	4	7	18	7.8	.8	.0
Missouri Valley							28.0	+1.3										83	1.03	−0.3										7.4		
Columbia, Mo. [2]	784	6	66	29.18	30.04	−.07	32.7	+1.0	63	29	39	6	25	26	35	29	26	81	1.08	−1.0	11	8.5	n.	25	n.	27	5	5	19	7.7	4.0	.0
Kansas City [1]	750	38	76	29.22	30.05	−.06	32.8	+1.6	66	29	40	10	25	26	35	30	26	78	1.07	−.8	7	11.0	n.	26	nw.	24	4	7	18	7.4	4.0	.0
St. Joseph [2]	967	11	49	29.16	30.06		29.6	.0	58	29	36	4	10	23	33	27	25	87	1.52	−.2	9	8.9	nw.	24	n.	23	5	8	16	7.0	9.0	.0
Springfield, Mo. [2]	1,324	5	78	28.55	30.02	−.09	34.4	−.8	71	29	42	10	25	27	39	31	28	83	1.31	−1.1	10	9.9	nw.	21	s.	23	5	6	18	7.4	7.9	.0
Topeka	987	65	87	28.96	30.05		31.8	+.8	67	29	39	10	10	25	35	29	26	79	1.00	−.6	5	10.1	n.	23	s.	15	4	10	15	7.0	3.2	.0
Lincoln [2]	1,189	11	81	28.76	30.08	−.02	26.2	+.1	55	29	33	2	9	19	31	23	21	85	1.18	+.2	5	9.6	n.	29	n.	8	6	6	17	7.3	10.4	.0
Omaha [1]	982	31	44	28.99	30.09	−.02	25.0	−.5	56	29	33	−3	9	17	37	24	21	85	1.17	+.2	9	11.2	n.	33	nw.	23	4	8	17	7.6	9.7	T
Valentine	2,598	47	54	27.25	30.06	−.03	25.4	+4.0	62	29	35	−4	9	16	44	24	21	84	.46	−.1	12	8.5	nw.	22	nw.	11	3	11	15	7.2	4.6	T
Sioux City	1,138	64	106	28.83	30.10	−.02	23.7	+2.7	52	29	31	−7	9	16	35	22	19	82	.68	−.2	9	9.6	n.	29	nw.	11	2	6	21	7.9	5.7	T
Huron [1]	1,289	27	41	28.68	30.13	+.01	18.1	+3.8	45	10	27	−14	24	9	38	18	16	88	.86	+.3	12	11.2	nw.	37	se.	29	4	11	14	7.1	10.7	1.0
Northern Slope							26.6	+4.1										77	0.90	+0.2										7.5		
Billings	3,570	17	31	26.24	30.05		26.8		54	29	36	−1	23	18	36	24	20	78	.74		14	10.8	sw.	31	sw.	13	3	5	21	7.7	13.2	T
Havre	2,507	11	67	27.34	30.09	+.02	15.8	+2.2	45	10	24	−10	24	7	35	15	12	84	.95	+.4	13	8.2	e.	27	sw.	29	5	5	19	7.0	17.1	8.3
Helena	4,124	85	111	25.71	30.02	−.09	26.6	+3.6	55	28	34	−3	23	19	37	24	19	72	.66	.0	13	6.2	nw.	36	sw.	28	0	7	22	8.7	9.6	T
Missoula [2]	3,263	80	91				33.1	+6.4	51	26	39	8	1	27	25	30	27	82	1.43	+.6	19	6.7	se.	33	sw.	28	1	2	26	9.0	5.8	T
Kalispell	2,973	48	56	26.85	29.98	−.10	30.2	+6.9	46	29	36	5	2	24	22	28	26	82	2.13	+1.0	19	4.3	w.	17	sw.	10	1	2	26	8.9	16.6	1.5
Miles City [2]	2,371	48	55	27.20	30.07	−.02	22.4	+5.6	54	29	31	−2	24	14	37	20	17	83	.54	.0	12	6.5	ne.	26	nw.	26	2	14	13	7.2	7.5	T
Rapid City [2]	3,259	50	58	26.61	30.06	−.02	27.6	+4.2	62	29	37	2	24	18	42	23	20	82	.23	−.3	10	7.8	n.	29	n.	26	9	5	15	6.3	2.8	.0
Cheyenne [1]	6,144	5	39	23.84	30.01	−.02	29.0	+1.7	63	28	38	4	17	20	33	24	18	66	.56	−.1	6	14.3	nw.	44	nw.	27	6	4	19	7.3	6.9	T
Lander	5,352	60	68	24.55	30.00	−.08	25.4	+2.9	58	28	38	−1	17	13	38	23	17	69	1.05	+.4	7	4.7	sw.	37	sw.	10	8	12	9	5.7	11.2	T
Sheridan	3,790	10	47	26.02	30.04		24.0		55	28	36	−7	17	12	39	22	17	73	.61	−.1	9	4.3	s.	24	nw.	26	3	9	17	7.6	9.0	T
Yellowstone Park	6,235	12	46	23.78	30.08	−.02	24.6	+3.6	43	28	32	−2	16	17	29	22	19	76	1.51	+.9	22	8.5	s.	30	n.	10	2	6	21	8.2	17.8	8.6
North Platte [2]	2,821	11	51	27.07	30.05	−.02	30.8	+4.2	66	27	41	7	9	21	42	26	23	81	.23	−.3	7	7.6	n.	25	nw.	11	9	6	14	5.9	3.0	.0

See footnotes at end of table.

TABLE 2.—*Climatological data for Weather Bureau Stations, February 1940*—Continued

District and station	Elevation of instruments: Barometer above sea level	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station, reduced to mean of 24 hours	Pressure: Sea level, reduced to mean of 24 hours	Pressure: Departure from normal	Temperature of the air: Mean max.+mean min.÷2	Temperature of the air: Departure from normal	Temperature of the air: Maximum	Temperature of the air: Date	Temperature of the air: Mean maximum	Temperature of the air: Minimum	Temperature of the air: Date	Temperature of the air: Mean minimum	Temperature of the air: Greatest daily range	Mean wet thermometer	Mean temperature of the dew-point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Days with .01, or more	Wind: Average hourly velocity	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Clear days	Partly cloudy days	Cloudy days	Average cloudiness, tenths	Total snowfall	Snow, sleet, and ice on ground at end of month
	Ft.	*Ft.*	*Ft.*	*In.*	*In.*	*In.*	°*F.*	°*F.*	°*F.*		°*F.*	°*F.*		°*F.*	°*F.*	°*F.*	°*F.*	%	*In.*	*In.*		*Miles*								0–10	*In.*	*In.*
Middle Slope							**35.3**	**+1.6**										**76**	**1.26**	**+0.4**										**6.4**		
Denver [2]	5,292	106	113	24.61	29.98	−.03	35.5	+2.8	74	28	46	13	17	25	33	28	22	67	.66	+.1	7	7.7	s.	27	nw.	11	4	12	13	6.9	9.7	.0
Pueblo [2]	4,670	79	86	25.10	29.98	−.02	36.5	+3.6	76	29	49	4	13	24	38	29	23	66	.66	+.2	8	6.9	w.	33	w.	11	8	11	10	5.4	8.1	.0
Concordia	1,392	50	58	28.54	30.07	−.02	29.5	−.3	63	29	37	6	9	22	32	28	25	84	.89	+.0	7	8.7	n.	24	sw.	23	5	8	16	7.2	6.9	.0
Dodge City	2,509	10	86	27.35	30.02	−.04	35.2	+2.0	76	29	44	14	9	26	36	31	27	76	.59	−.2	7	12.7	n.	31	n.	16	11	4	14	5.7	5.9	T
Wichita [2]	1,358	85	93	28.51	30.02	−.06	34.8	+.4	70	29	42	13	9	27	33	31	28	82	1.43	+.1	5	11.4	n.	25	s.	15	7	7	15	6.7	6.1	.0
Oklahoma City [2]	1,214	10	47	28.60	30.01	−.06	40.5	+.9	81	29	50	21	9	31	38	36	32	79	3.35	+2.2	8	11.7	n.	26	s.	14	7	9	13	6.5	5.2	.0
Chadron, Nebr.	1,349	4	58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Southern Slope							**47.0**	**+1.0**										**66**	**1.61**	**+0.9**										**5.2**		
Abilene [2]	1,738	10	56	28.15	29.99	−.06	47.8	+.6	89	29	59	25	25	37	35	40	33	68	3.50	+2.4	9	11.7	s.	30	s.	26	8	8	13	5.9	.2	.0
Amarillo [2]	3,676	10	49	26.27	29.98	−.04	41.2	+3.1	83	29	53	18	13	30	37	33	27	73	.88	+.2	6	9.9	w.	32	w.	26	11	7	11	5.3	6.8	.0
Del Rio	960	63	71	28.99	29.99	−.01	54.4	−1.6	91	28	65	34	9	44	42	47	39	64	1.30	+.7	7	10.1	nw.	35	nw.	17	11	8	10	5.2	T	.0
Roswell	3,566	75	85	26.34	29.98	.00	44.4	+1.9	83	29	58	19	20	30	48	37	27	57	.77	+.2	4	8.7	nw.	32	w.	7	13	10	6	4.2	5.0	.0
Southern Plateau							**47.3**	**+0.9**										**52**	**1.00**	**+0.4**										**4.4**		
El Paso [2]	3,778	82	101	26.02	29.95	.00	50.4	+1.4	80	25	62	28	18	39	42	39	25	43	.41	.0	4	8.5	w.	25	sw.	26	17	10	2	3.4	T	.0
Albuquerque [1]	5,314	5	34	24.70	29.98	.....	39.2	−1.3	70	29	50	18	13	28	35	33	26	63	.58	+.2	5	8.6	ne.	33	e.	2	9	10	10	5.5	3.7	.0
Santa Fe	7,013	38	53	23.16	30.01	+.03	32.2	−.9	62	28	42	8	13	22	28	27	20	60	1.97	+1.2	13	5.9	n.	20	sw.	26	9	8	12	5.7	17.1	.0
Flagstaff	6,907	10	59	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Phoenix [2]	1,107	39	51	28.83	30.00	+.01	56.8	+1.7	83	28	70	35	13	44	38	44	32	49	.61	−.2	7	5.5	e.	30	w.	29	11	11	7	4.7	.0	.0
Yuma	141	9	54	29.89	30.04	+.04	59.6	+1.0	84	28	72	38	16	47	34	48	35	45	.25	−.2	4	5.9	n.	29	w.	29	20	5	4	3.1	.0	.0
Independence	3,957	5	26	.....	.....	.....	45.8	+3.6	66	27	56	24	16	34	32	37	26	..	2.15	+1.4	7	.....	n.	21	n.	7	.....	.....	.....	3.5	.....	.....
Middle Plateau							**38.2**	**+4.7**										**69**	**1.57**	**+0.5**										**7.5**		
Reno [2]	4,527	61	76	25.56	30.01	−.07	40.4	+4.1	58	27	49	20	19	32	29	36	29	66	1.57	+.4	12	7.1	w.	35	w.	10	5	11	13	6.4	.9	.0
Tonopah	6,090	12	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winnemucca	4,344	18	56	25.59	30.02	−.07	38.3	+4.8	59	27	47	18	12	30	27	34	29	70	1.19	+.2	16	8.4	sw.	35	sw.	28	2	4	23	8.2	5.1	.0
Modena	5,473	10	46	24.59	30.00	−.04	34.8	+3.8	57	28	44	12	20	26	32	31	25	70	1.72	+.7	13	9.4	sw.	29	sw.	29	4	6	19	7.7	2.0	.0
Salt Lake City [1]	4,227	32	46	25.71	30.03	−.05	39.4	+5.6	64	28	46	21	16	33	23	34	30	75	2.32	+.8	15	7.1	s.	34	nw.	10	2	5	22	8.0	12.0	.0
Grand Junction	4,602	60	68	25.36	29.98	−.06	37.9	+5.0	66	29	46	19	17	29	29	33	25	62	1.04	+.4	11	5.0	se.	19	w.	29	2	11	16	7.3	3.5	.0
Northern Plateau							**37.5**	**+4.9**										**78**	**2.98**	**+1.5**										**8.2**		
Baker	3,471	36	54	26.48	30.01	−.11	35.0	+6.0	57	27	42	14	23	27	29	32	29	84	1.51	+.2	16	6.5	se.	28	sw.	27	3	9	17	7.3	9.5	.0
Boise [2]	2,739	79	87	27.02	30.02	−.10	38.9	+4.1	63	28	46	21	1	32	23	36	31	74	1.78	+.3	19	11.5	se.	43	sw.	28	3	5	21	8.0	1.5	.0
Pocatello [1]	4,478	5	31	25.43	30.03	−.07	33.7	+4.8	53	27	40	5	21	27	28	31	28	80	1.87	+.6	15	11.9	sw.	40	s.	28	0	6	23	9.0	10.3	.0
Spokane [2]	1,929	101	110	27.85	29.96	−.13	35.9	+4.6	53	29	41	21	23	31	17	34	31	83	5.62	+3.8	18	6.4	s.	21	s.	6	1	5	23	8.7	10.9	.0
Walla Walla	991	57	65	28.88	29.97	−.14	42.6	+5.5	59	26	49	27	2	37	20	39	35	74	3.99	+2.2	21	6.4	s.	27	w.	26	2	2	25	9.0	3.4	.0
Yakima	1,076	58	67	28.79	29.95	.....	38.7	+4.2	57	29	46	18	1	31	27	36	32	76	3.11	+2.1	15	4.3	nw.	22	nw.	29	6	3	20	7.3	4.5	.0
North Pacific Coast Region							**46.5**	**+4.5**										**81**	**9.44**	**+3.9**										**8.4**		
North Head	211	8	56	29.66	29.89	−.17	47.2	+4.2	58	1	51	37	21	43	19	45	43	87	13.24	+5.6	25	17.4	s.	56	s.	12	2	5	22	8.1	.0	.0
Seattle [2]	125	90	321	29.86	29.90	−.16	47.0	+5.9	63	1	52	35	20	42	21	43	39	79	6.65	+2.7	23	10.9	s.	36	s.	9	2	7	20	8.0	.0	.0
Tacoma	263	172	201	29.70	29.92	−.15	45.6	+5.0	60	1	50	32	20	41	15	..	..	..	7.27	+2.5	21	9.1	s.	29	sw.	26	2	3	24	8.6	.0	.0
Tatoosh Island	86	9	55	29.74	29.83	−.17	46.2	+5.2	56	1	49	34	22	43	12	44	40	81	13.08	+3.3	26	18.6	e.	49	e.	3	4	5	26	7.6	T	.0
Medford [1] [4]	1,329	29	58	28.57	30.00	.....	44.6	+2.1	63	26	52	26	20	37	30	42	39	82	5.36	+2.9	20	.....	nw.	.....	.....	.....	0	8	21	8.6	T	.0
Portland, Oreg. [2]	154	68	106	29.88	29.93	−.15	47.2	+5.1	59	29	52	32	12	42	18	44	41	82	10.82	+5.3	25	7.2	s.	21	ne.	1	1	5	23	8.9	.0	.0
Roseburg	510	45	76	29.41	29.97	−.13	47.4	+4.0	64	26	54	32	23	41	26	44	41	80	9.71	+5.1	23	4.4	s.	21	s	28	0	4	27	9.0	.0	.0
Middle Pacific Coast Region							**52.6**	**+2.8**										**76**	**10.31**	**+5.2**										**7.7**		
Eureka	60	72	88	29.96	30.03	−.08	51.7	+4.5	66	5	57	36	19	46	17	48	45	79	9.62	+3.0	19	8.4	se.	31	sw.	4	2	4	23	8.6	.0	.0
Redding [1]	722	20	34	29.24	30.02	.....	50.0	+.3	70	1	56	32	15	44	26	45	40	70	14.57	+7.8	17	8.6	nw.	40	se.	27	2	7	20	8.0	.0	.0
Sacramento [2]	66	92	115	30.02	30.05	−.04	53.1	+3.0	67	28	60	37	19	46	21	49	45	77	9.25	+6.2	14	8.5	se.	34	sw.	28	6	4	19	7.2	.0	.0
San Francisco	155	112	132	29.88	30.05	−.05	55.4	+3.2	66	8	60	46	18	51	16	51	47	76	7.81	+3.9	17	8.0	w.	34	s.	27	4	6	19	7.1	.0	.0
South Pacific Coast Region							**56.7**	**+2.8**										**69**	**4.07**	**+1.9**										**6.0**		
Fresno [1]	327	97	105	29.78	30.09	+.01	52.8	+1.7	70	24	62	34	19	44	28	49	45	76	3.22	+1.8	12	5.8	se.	19	nw.	18	4	8	17	7.4	.0	.0
Los Angeles	338	159	191	29.70	30.06	.00	59.4	+3.9	78	20	67	47	17	52	28	51	41	58	5.43	+2.3	8	6.8	ne.	21	ne.	3	9	13	7	4.9	.0	.0
San Diego [2]	87	62	70	30.04	30.07	+.01	57.9	+2.8	76	20	66	42	16	50	32	53	48	73	3.56	+1.5	12	6.6	w.	27	se.	1	6	13	10	5.8	.0	.0
West Indies																																
San Juan, P. R.	82	9	54	29.91	30.00	.....	76.3	+1.4	87	21	81	69	8	72	15	..	.....	.....	3.49	+.6	17	11.8	e.	27	ne.	24	5	15	9	5.8	.0	.0
Panama Canal																																
Balboa Heights	118	6	92	.....	[3] 29.84	−.02	81.7	.....	93	28	90	70	2	74	20	.....	.....	[3] 73	.11	−.5	4	10.0	n.	29	n.	21	10	19	0	4.1	.0	.0
Cristobal	36	6	97	.....	[3] 29.86	−.02	81.4	.....	87	17	85	75	2	78	11	75	73	[3] 78	1.83	+.3	17	14.2	n.	32	n.	22	1	22	6	6.0	.0	.0
Alaska																																
Fairbanks	454	11	87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Juneau	80	96	116	.....	[4] 29.83	.....	32.2	+2.0	47	4	36	10	28	28	.....	.....	.....	.....	2.23	−3.4	8	8.8	ne.	37	ne.	25	11	3	15	.....	.9	.0
Nome	22	5	57	.....	[4] 29.87	.....	6.4	+1.2	36	23	16	−27	13	−3	.....	.....	.....	66	.40	−.4	6	8.9	ne.	35	e.	25	15	3	11	.....	4.0	4.6
Hawaiian Islands																																
Honolulu	38	86	100	29.94	29.98	.....	72.6	+1.8	80	5	78	60	24	68	16	66	62	72	.50	−3.4	11	8.0	e.	21	sw.	26	9	19	1	4.2	.0	.0

[1] Data are airport records. [2] Barometric and hygrometric data from airport, other data city office records. [3] Observations taken hourly.
[4] Pressure not reduced to a mean of 24 hours. [5] Barometric data from city office record.

NOTE.—Except as indicated by notes 1 and 2, data in table 2 are city office records.

TABLE 3.—*Data furnished by the Canadian Meteorological Service, February 1940*

Stations	Altitude above mean sea level, Jan. 1, 1919	Pressure			Temperature of the air						Precipitation		
		Station reduced to mean of 24 hours	Sea level reduced to mean of 24 hours	Departure from normal	Mean max.+mean min.÷2	Departure from normal	Mean maximum	Mean minimum	Highest	Lowest	Total	Departure from normal	Total snowfall
	Feet	*In.*	*In.*	*In.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	°*F.*	*In.*	*In.*	*In.*
Cape Race, Newfoundland	99												
Sydney, Cape Breton Island	48	29.67	29.68	−0.23	21.8	+2.0	29.3	14.2	38	0	2.85	−1.56	18.3
Halifax, Nova Scotia	88	29.51	29.79	−.16	24.0	+1.0	30.1	17.9	44	5	4.20	−.21	16.8
Yarmouth, Nova Scotia	65	29.71	29.83	−.13	26.6	+1.2	33.1	20.2	46	7	4.48	+.18	26.9
Charlottetown, Prince Edward Island	38	29.71	29.79	−.13	18.8	+2.2	26.4	11.2	41	−5	2.79	−.48	24.7
Chatham, New Brunswick	28	29.70	29.82	−.13	17.2	+3.6	27.8	6.6	43	−15	1.39	−1.33	13.9
Father Point, Quebec	20	29.91	29.93	−.03	14.0	+3.6	21.5	6.6	32	−8	.89	−1.07	8.9
Quebec, Quebec	296												
Senneterre, Quebec [3]	1,038												
St. Hubert Airport, Quebec [2]	102	29.90	30.02	−.01	13.6	.0	23.1	4.2	35	−14	1.71	−.65	17.0
Ottawa, Ontario	236	29.63	30.02	−.02	13.0	+.8	22.7	3.2	38	−14	1.46	−1.03	14.6
Kingston, Ontario	285	29.71	30.04	−.02	18.0	+1.2	25.2	10.9	37	−3	2.46	+.27	24.6
Toronto, Ontario	379	29.61	30.04	−.03	24.4	+3.9	30.0	18.9	41	2	1.54	−.94	15.3
Porquis Junction, Ontario	1,009	[1] 29.97	[1] 30.13		6.8		17.6	−3.9	33	−25	.77		7.7
White River, Ontario	1,244	28.71	30.14	+.08	8.0	+10.8	22.6	−6.7	35	−41	1.15	−.10	11.5
London, Ontario	808	29.12	30.03		22.4	+2.6	29.4	15.4	40	−4	1.60	−1.84	14.7
Southampton, Ontario	656	29.32	30.05	+.02	20.4	+.8	27.3	13.4	37	−3	1.64	−1.20	16.4
Parry Sound, Ontario	688	29.35	30.09	+.02	16.2	+3.1	25.8	6.6	41	−13	1.42	−1.46	14.2
Port Arthur, Ontario	644	29.38	30.12	+.04	15.6	+6.6	24.4	6.7	36	−15	.88	+.17	8.8
Winnipeg, Manitoba	760	29.26	30.18	.00	9.4	+7.8	18.2	.5	30	−25	.69	−.15	6.9
Minnedosa, Manitoba	1,690	28.25	30.17	+.03	9.2	+9.0	17.2	1.1	32	−31	1.37	+.80	13.7
Le Pas, Manitoba	860	29.16	30.19	+.02	4.8	+3.9	15.4	−5.7	29	−32	.52	−.01	5.2
Qu'Appelle, Saskatchewan	2,115	27.73	30.13	−.03	10.2	+5.8	17.2	3.3	40	−23	1.37	+.62	13.6
Regina, Saskatchewan [1]	1,900	28.02	30.14		9.4	+7.4	17.0	1.7	42	−34	.52	+.17	5.2
Swift Current, Saskatchewan	2,392	27.16	30.13	−.02	12.2	+3.5	19.5	5.0	40	−22	.77	+.18	7.5
Medicine Hat, Alberta	2,365	27.49	30.11	−.02	12.5	−3.0	20.9	4.1	41	−21	2.21	+1.63	22.1
Calgary, Alberta	3,540	26.24	30.10	−.01	12.6	−1.9	20.7	4.4	47	−26	.88	+.30	8.8
Banff, Alberta	4,521												
Prince Albert, Saskatchewan	1,450	28.53	30.17	+.02	9.4	+8.0	17.6	1.2	43	−31	.33	−.26	3.3
Battleford, Saskatchewan	1,592	28.25	30.09	−.06	7.5	+8.2	16.4	−1.4	41	−42	.56	+.19	5.6
Edmonton, Alberta	2,150	27.63	30.09		11.8	+.2	18.9	4.7	45	−33	.56	−.10	5.6
Kamloops, British Columbia	1,262	28.57	29.95	−.13	33.4	+6.6	39.6	27.3	52	19	.48	−.22	4.5
Victoria, British Columbia	230	29.62	29.87	−.16	44.1	+3.7	48.2	40.0	53	34	3.14	−.03	T
Barkerville, British Columbia	4,180												
Estevan Point, British Columbia	20	29.78	29.81	−.17	44.4	+3.0	50.2	38.7	56	29	16.92	+5.69	.0
Prince Rupert, British Columbia	170												
St. Georges, Bermuda	158												

[1] Pressure not reduced to a mean of 24 hours.
[2] Observations taken at St. Hubert Airport of Montreal.
[3] Station at Doucet, Quebec, closed Senneterre, substituted.

TABLE 4.—*Severe local storms, February 1940*

[Compiled by Mary O. Souder from reports submitted by Weather Bureau officials]

[The table herewith contains such data as has been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Meteorological Yearbook]

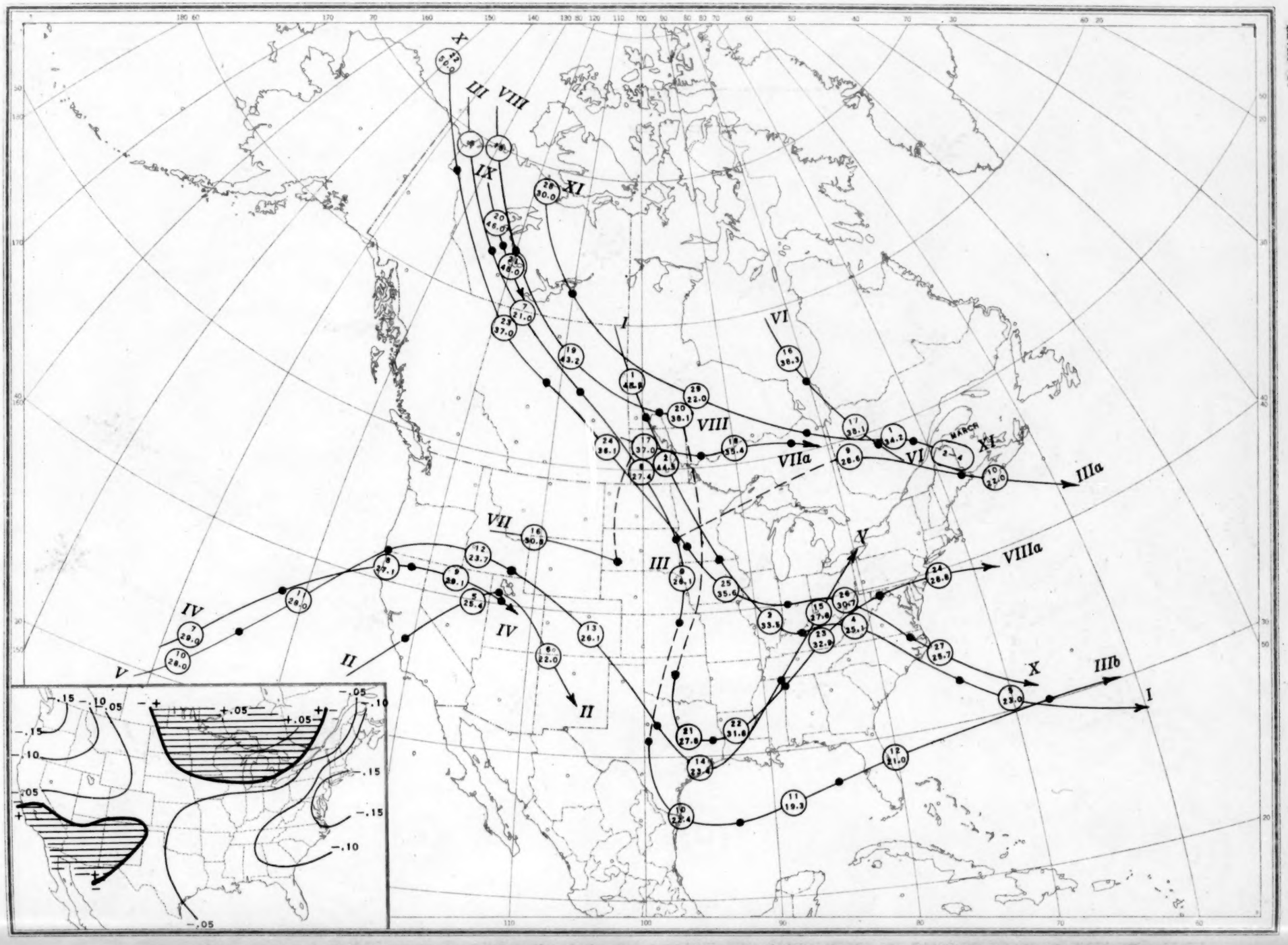
Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Convent, La., 2 miles west	5	4 p. m.	165	0	$3,000	Tornado	Storm occurred at Lily Plantation and moved from southwest to northeast. Property damaged; path 2½ miles long.
Nebraska, southeastern portion.	8					Wind and snow	Most roads, especially those running east and west, blocked by snow, some not yet opened at the end of the month. The drifts were so solidly packed by the wind that they could not be dislodged by available equipment.
Albany, Ga	10	4:20 a. m.		17	5,000,000	Tornado	More than 300 persons injured and about 1,000 homeless. The destruction affected 32 city blocks of which about 10 blocks consisted of stores, warehouses, hotels, and office buildings mostly of brick construction.
Minnesota, southern counties.	11–12					Heavy snow and wind.	Traffic delayed.
St. Clair, Ala	13	3:30 p. m.	50		2,500	Tornadic winds	Property damaged; 3 persons injured.
Ohio, Mason, Wood, Randolph, and Monongalia Counties, W. Va.	13–14					Heavy snow	Highways blocked; schools closed.
Louisville, Ky [1]	14					Snow	Snowfall measured 9 inches; traffic delayed.
New York State	14			21		do	From 6 to 18 inches of snow fell over most of the State except in the northern portion. High winds caused much drifting, blocking side roads and making it difficult to keep the main roads open. Several school busses and hundreds of motorists marooned for hours on highways. Schools closed from 1 to 3 days. Railroad traffic delayed and some airports abandoned.
Ohio [1]	14					do	Drifts as high as 20 feet piled up in the mining area of eastern Ohio keeping more than 3,000 miners from employment. Schools closed and roads blocked. In Cincinnati alone hundreds of automobiles were abandoned temporarily, the city's steep, icy streets made travel impossible.
Patrick, Floyd, Amherst, and Madison Counties, Va.	14				4,000	Wind	Many trees uprooted; several barns and buildings unroofed.
Washington, D. C	14					Blizzard	Rain and sleet which preceded the snow froze and formed a treacherous coating on city streets. All roads in Rock Creek Park closed. Visibility poor; traffic congested; schools closed.
New Jersey [1]	14–15			4		Heavy snow and wind.	Snowfall ranged in inches from 3 in the extreme southern portion of the State to 8 or 9 in the central portion and as much as 15 in the extreme northern portion. The snow was preceded by much sleet, but there was little or no coating of trees or other objects. High winds caused much drifting, blocking roads. In many locations schools were closed on the 15th. Maximum wind velocity on the coast reached 50 miles an hour for a 5-minute period. In Atlantic City all activities were slowed up due to high winds and icy streets.
Pennsylvania	14–15					Wind and snow	Heaviest snowfall occurred over a wide belt extending from northeast to southwest across the State. In Hollisterville, Wayne County, 49.5 inches fell. Much drifting caused traffic congestion on main highways for 3 or 4 days. Airplane flights canceled and railroads ran on delayed schedules.
New Orleans, La	16	1:11 p. m.			4,400	Wind	Property damaged; 1 person injured.
Texas, southern Panhandle and Southern Plains areas.	16	P. m.				Blizzard	Army, state and city authorities joined forces in rushing aid to snow-bound travelers marooned on blocked highways. Army trucks, ladened with medicines, blankets, and food went through huge drifts to aid at least 20 persons cut off over night near Tahoka. 100 school children occupying 3 Tahoka school busses rescued after being marooned all night. In the vicinity of Woodrow, 2 highway patrol cars rescuing travelers from stranded cars became stuck in snowdrifts early Friday night. More than 850 motorists stranded.
Newton, Ala	19				10,000	Rain and flood	Rain on the 18th caused the Chotcawhatchee River to rise slightly above flood stage on the 19th causing property damage.
Brewerton, N. Y	19–20				3,500	Heavy wet snow	Weight of snow caused the main building of a lumber company to collapse.
Syracuse and Marcellus, N. Y., and vicinities.	19–20					do	Roofs on a church and several buildings collapsed.
Lafayette and Carencro, La., and vicinities.	24	4–5 p. m.	880		2,600	Wind and hail	9 farm buildings damaged or destroyed; 3 persons slightly injured.
Butte, Mont	28				5,000	Wind	Property damaged.

[1] From press reports.

U. S. GOVERNMENT PRINTING OFFICE: 1940

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, February 1940

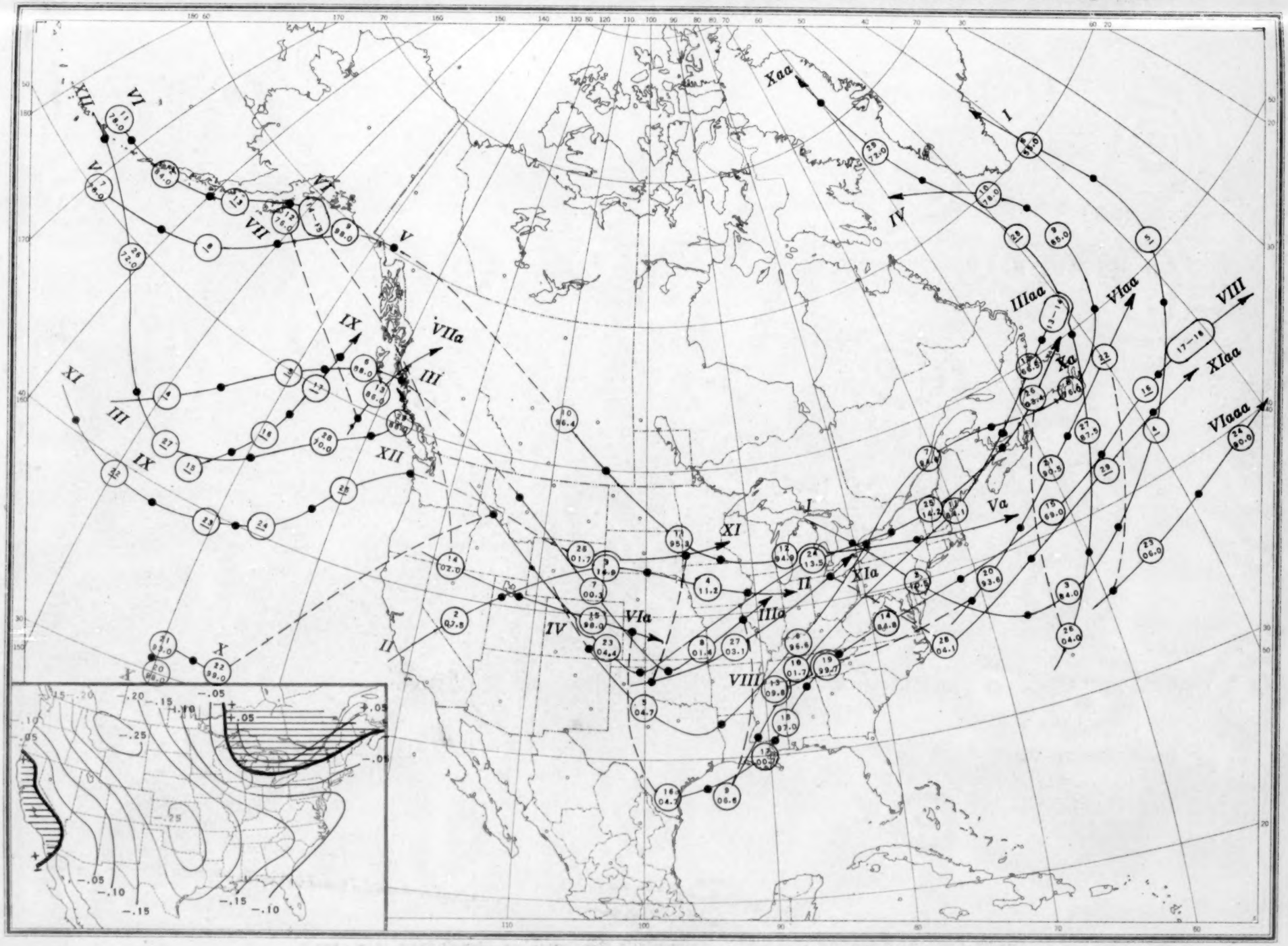
Chart II. Tracks of Centers of Anticyclones, February 1940. (Inset) Departure of Monthly Mean Pressure from Normal



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time).

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time).

Chart III. Tracks of Centers of Cyclones, February 1940. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time).

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, February 1940

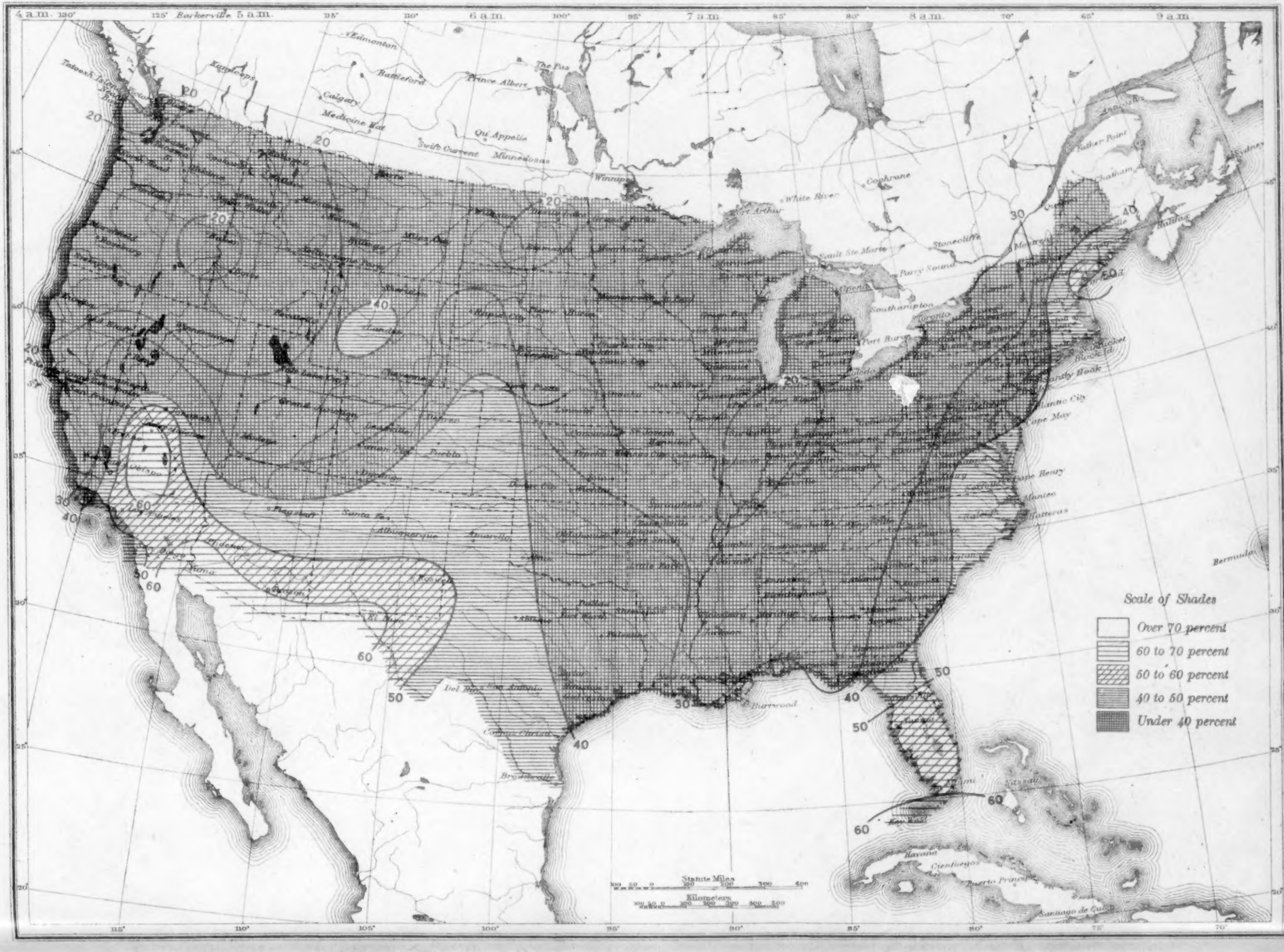


Chart V. Total Precipitation, Inches, February 1940. (Inset) **Departure of Precipitation from Normal**

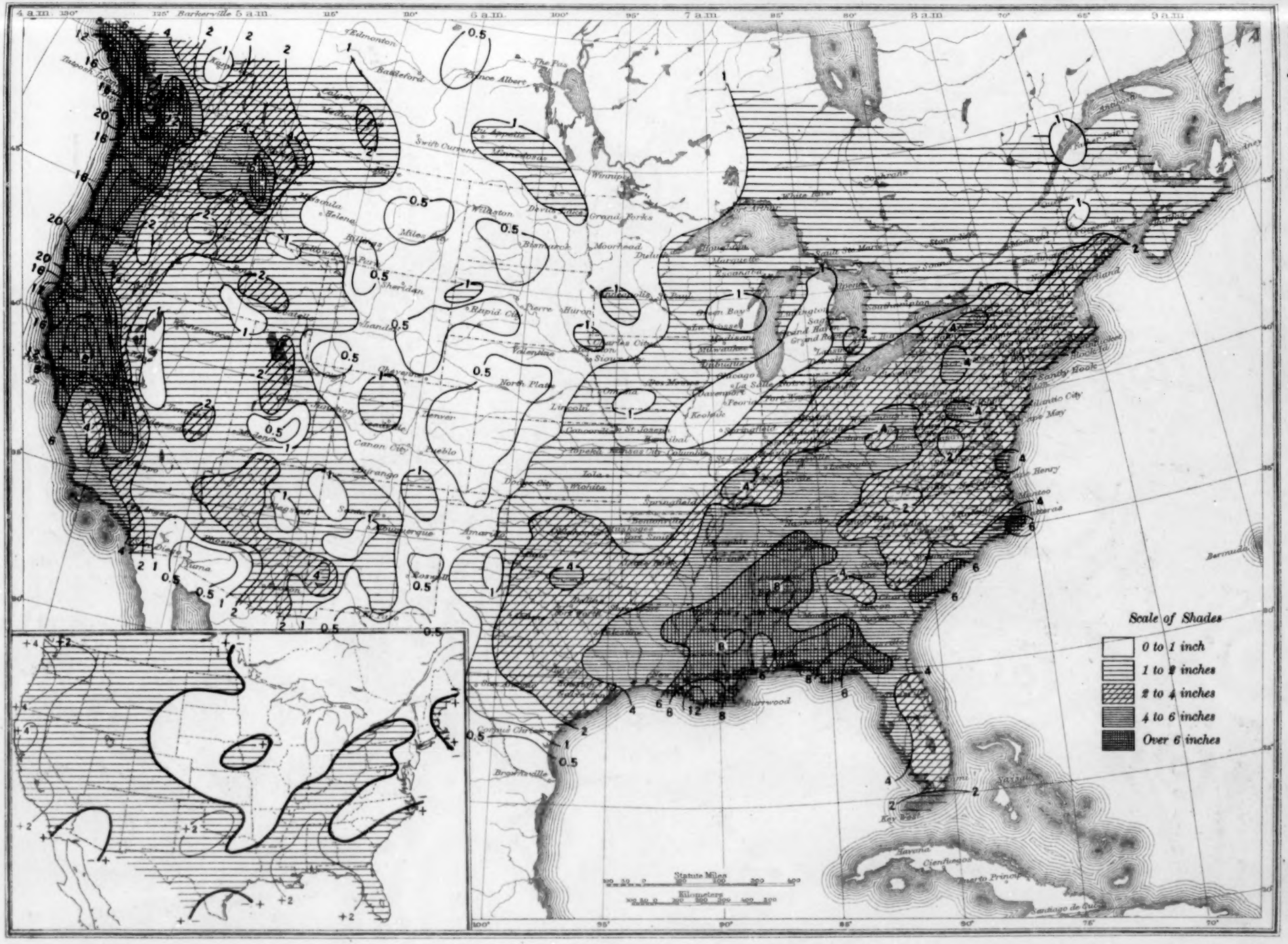


Chart VI. Isobars at Sea Level and Isotherms at Surface; Prevailing Winds, February 1940

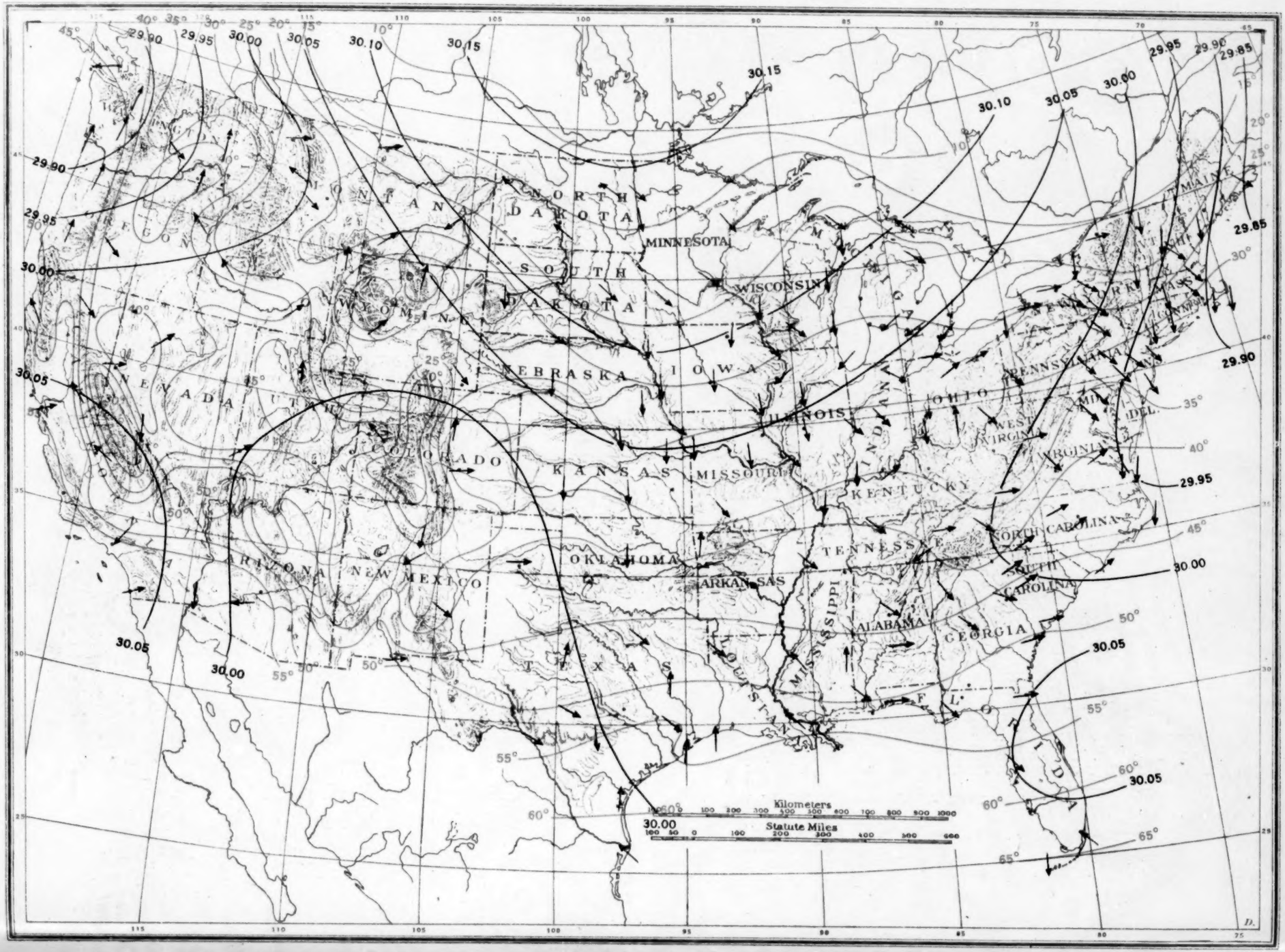


Chart VII. Total Snowfall, Inches, February 1940. (Inset) Depth of Snow on the Ground at 7:30 p.m., Monday, February 26, 1940

Chart VII. Total Snowfall, Inches, February 1940. (Inset) Depth of Snow on the Ground at 7:30 p.m., Monday, February 26, 1940

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.) and Isotherms (°C.) and Resultant Winds for 1,500 Meters (m. s. l.) February 1940

Chart VIII. Isobars (mb) for 1,524 Meters (5,000 ft.) and Isotherms (°C.) and Resultant Winds for 1,500 Meters (m. s. l.) February 1940

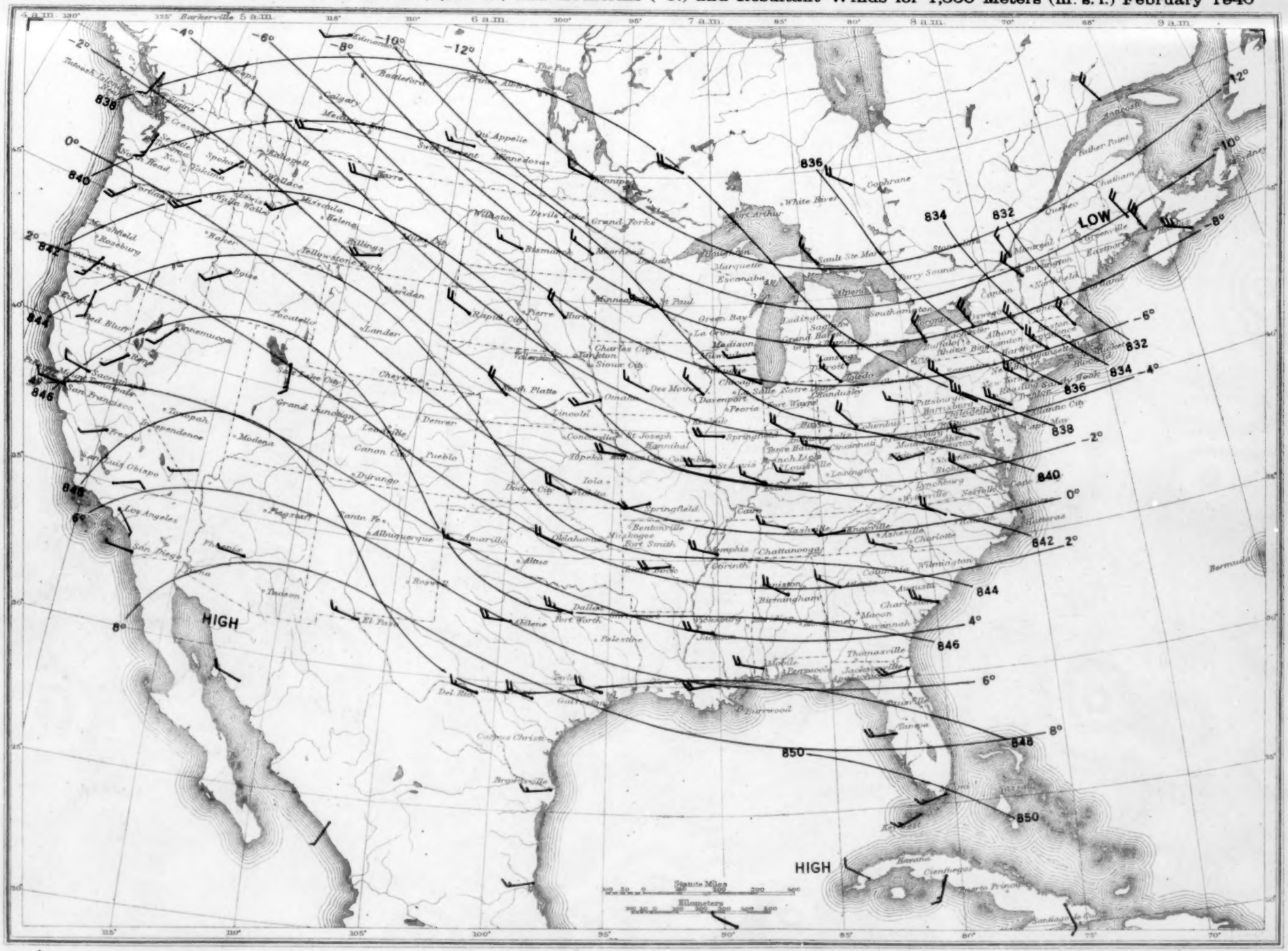


Chart IX. Isobars (mb) Isotherms (°C.) and Resultant Winds for 3,000 Meters (m. s. l.) February 1940

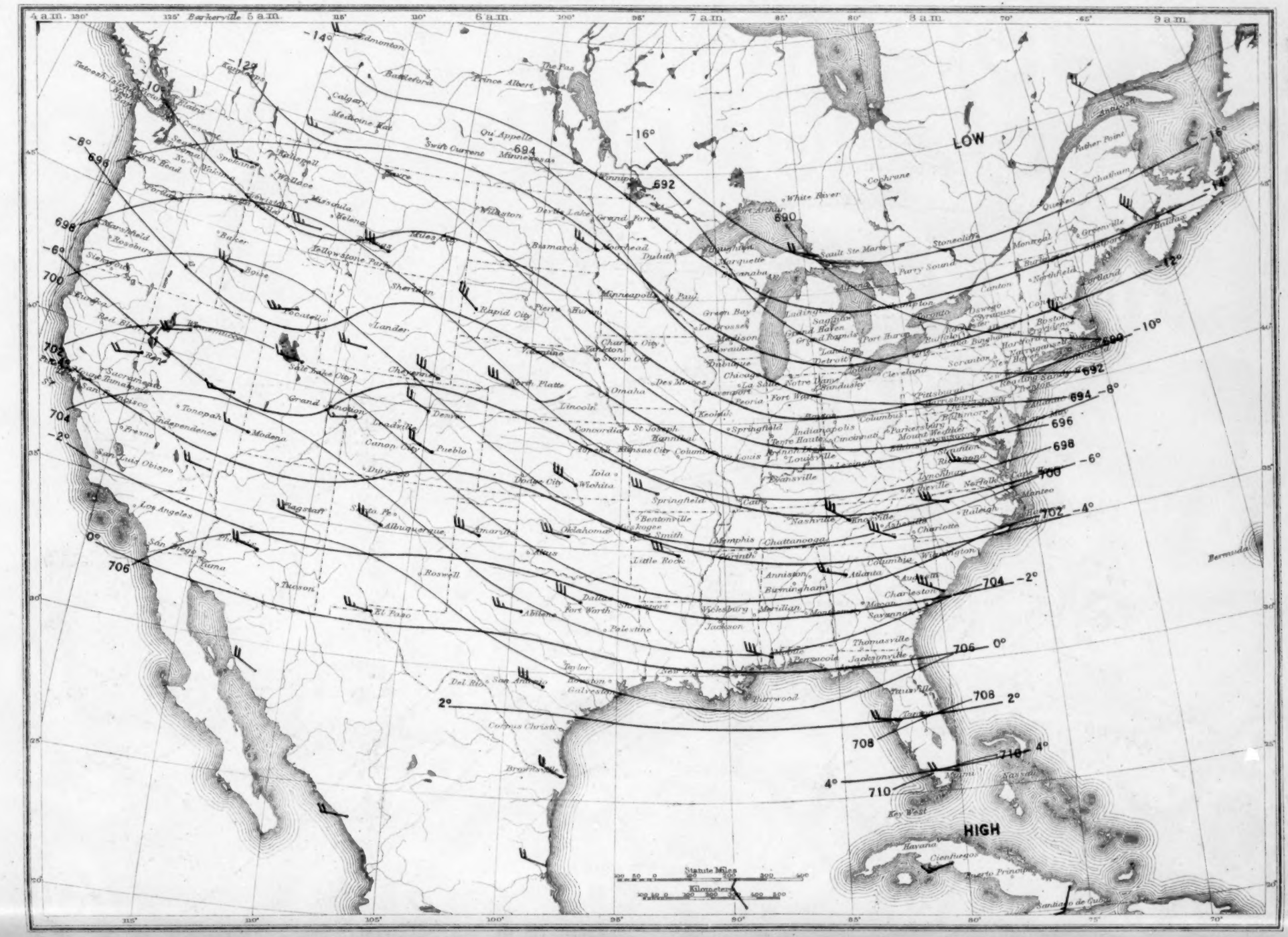


Chart X. Isobars (mb) Isotherms (°C.) and Resultant Winds for 5,000 Meters (m. s. l.) February 1940

Chart X. Isobars (mb) Isotherms (°C.) and Resultant Winds for 5,000 Meters (m. s. l.) February 1940

Chart XI. Isobars (mb) Isotherms (°C.) and Resultant Winds for 10,000 Meters (m. s. l.) February 1940

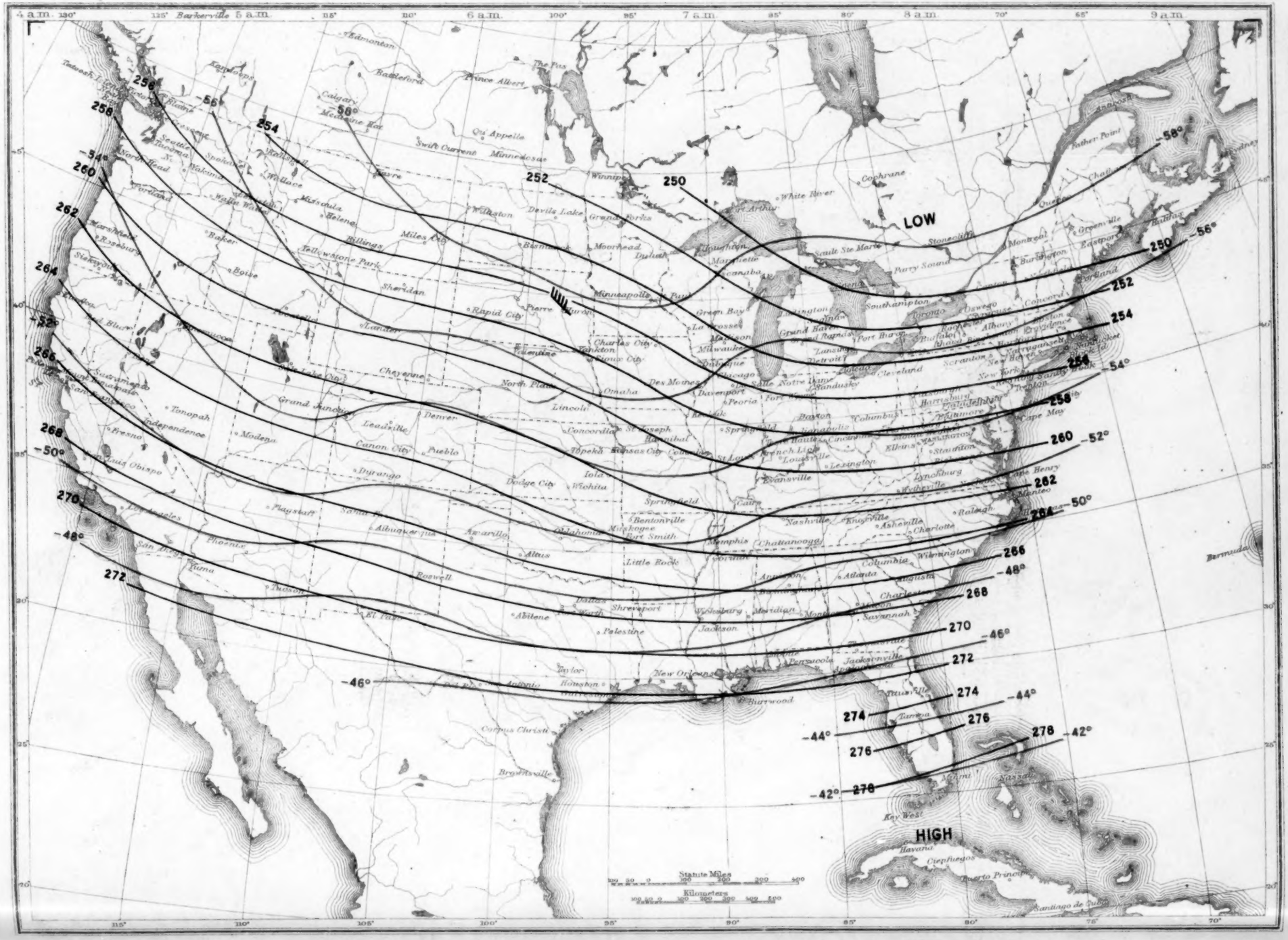


Chart XII. Mean Isentropic Chart, February 1940 (Potential Temperature 296° A.)

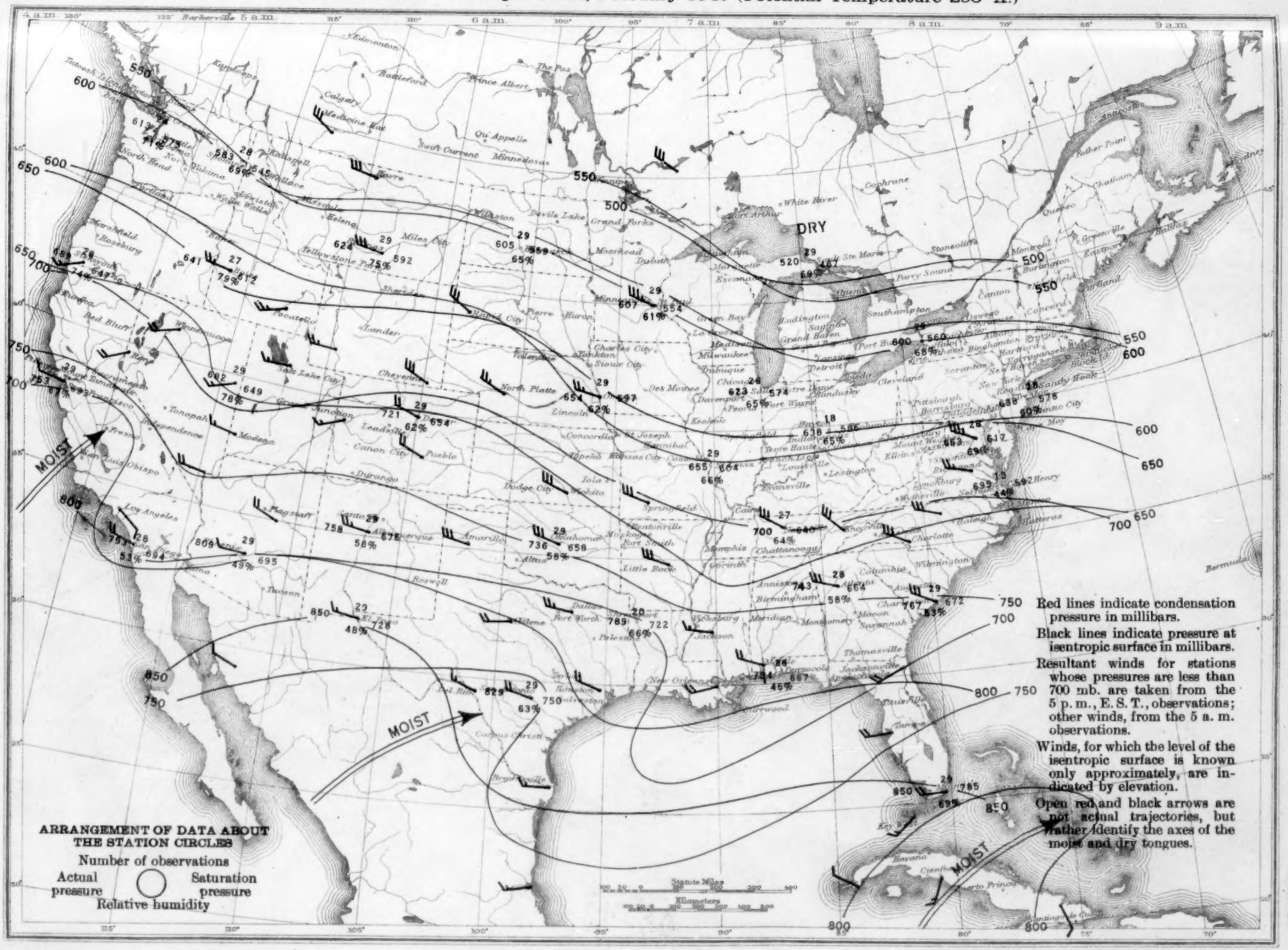


Chart XIII. Mean Tropopause Data, Altitude (km.) (m. s. l.) Temperature (°C.) February 1940

(Data from table 4)

Chart XIV. Weather Map of North Atlantic Ocean, February 3, 1940

Chart XIV. Weather Map of North Atlantic Ocean, February 3, 1940
(Plotted from the Weather Bureau Northern Hemisphere Chart)

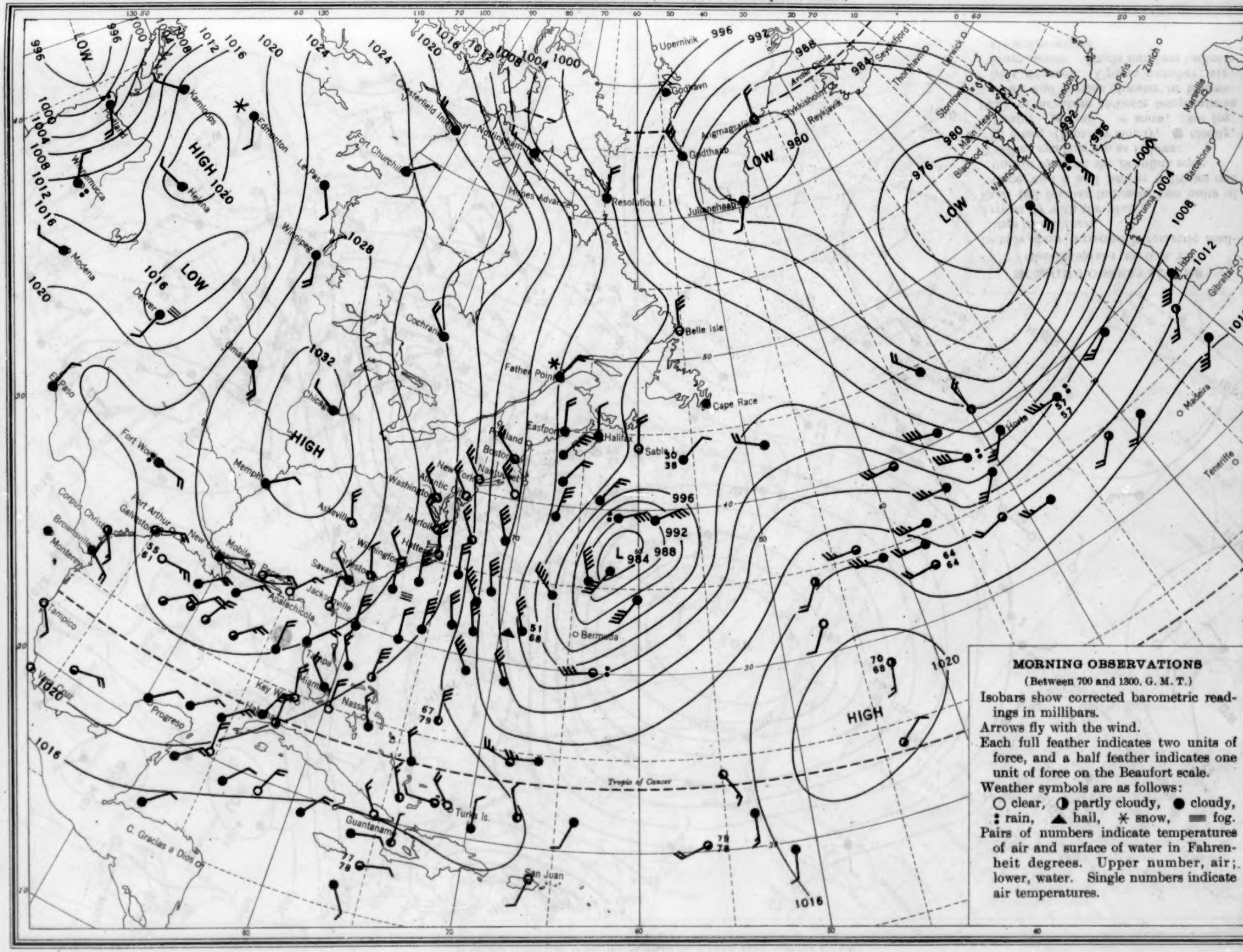


Chart XV. Weather Map of North Atlantic Ocean, February 14, 1940

(Plotted from the Weather Bureau Northern Hemisphere Chart)

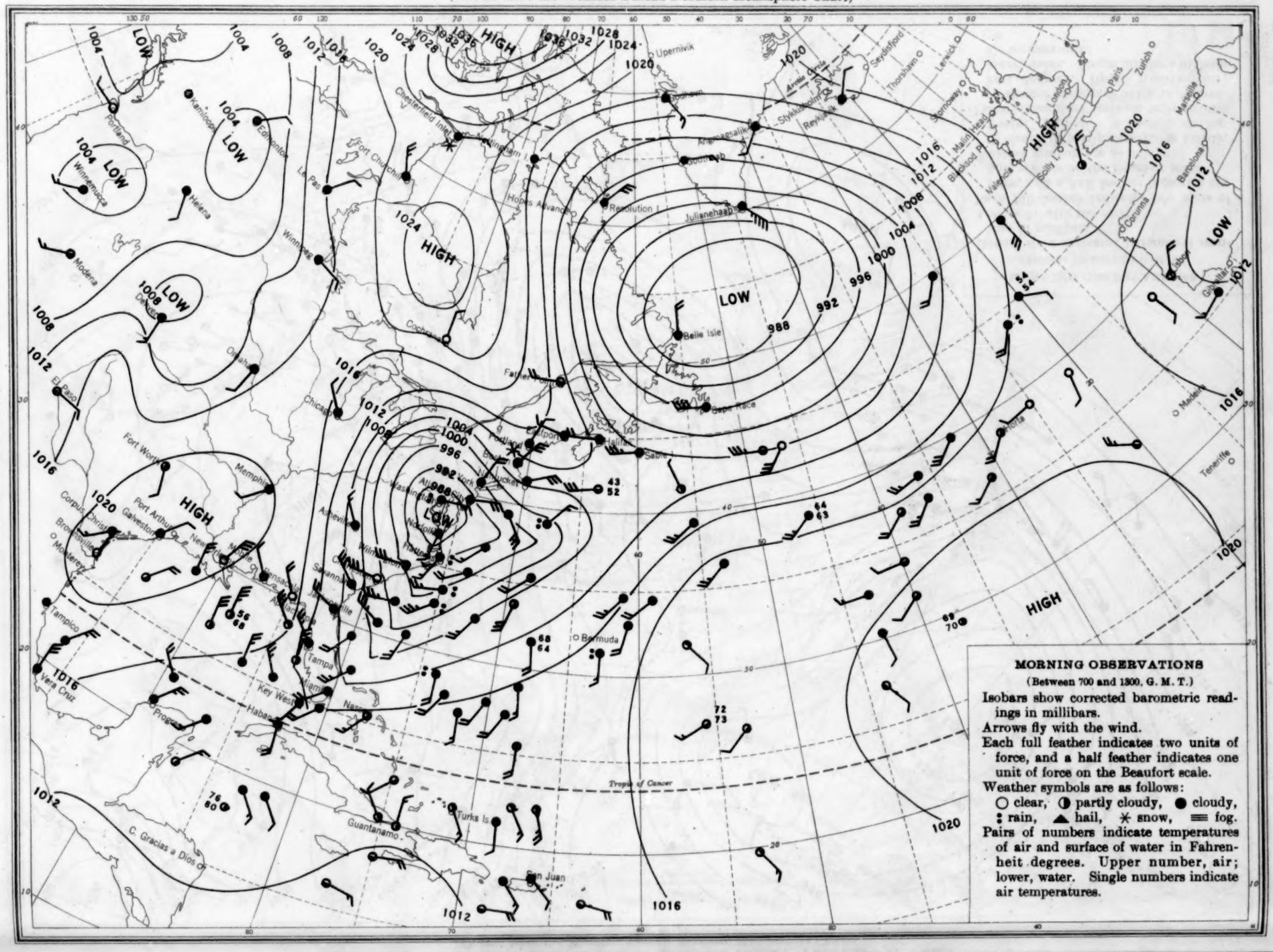
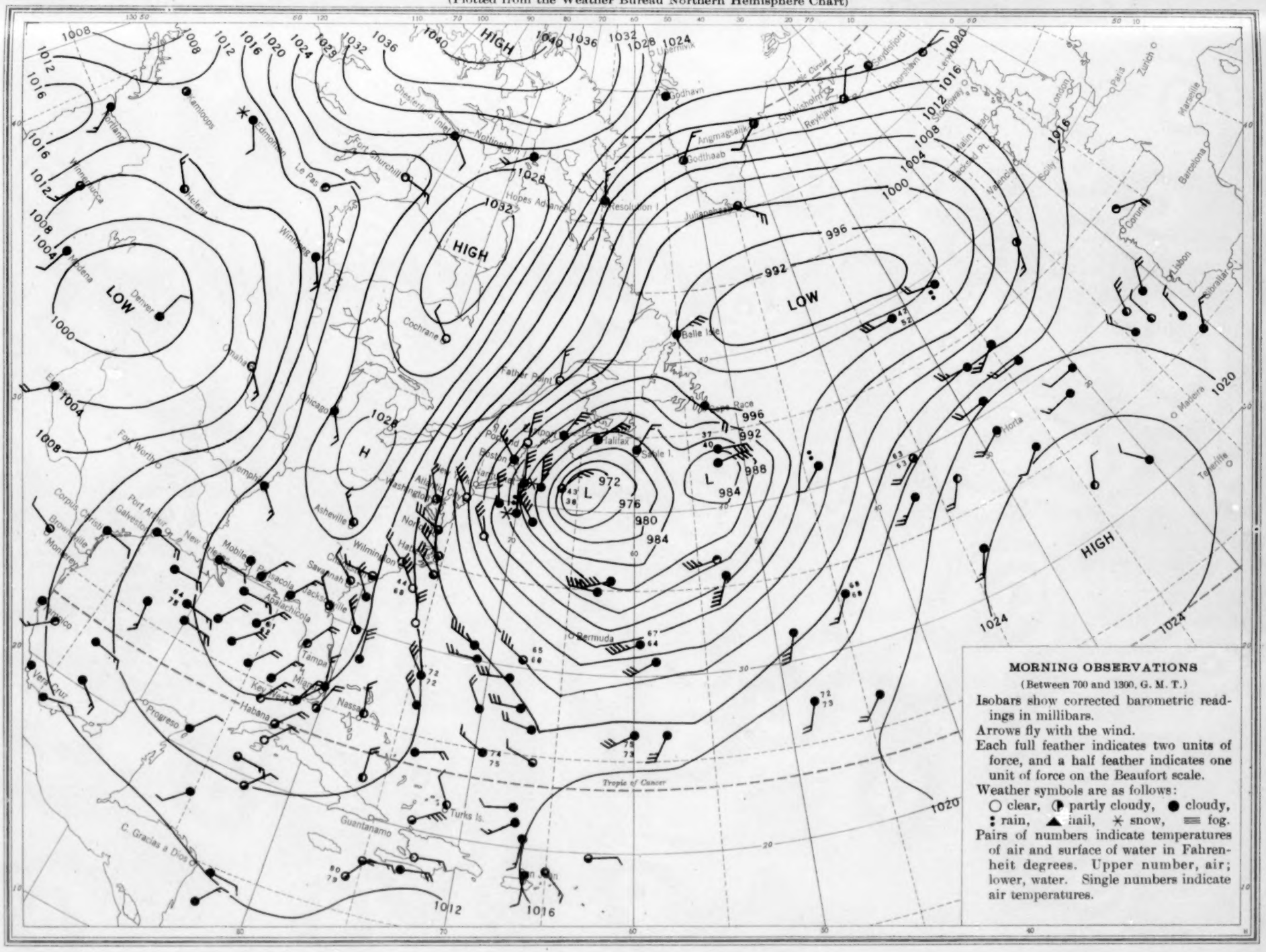


Chart XVI. Weather Map of North Atlantic Ocean, February 15, 1940

Chart XVI. Weather Map of North Atlantic Ocean, February 15, 1940

(Plotted from the Weather Bureau Northern Hemisphere Chart)



MORNING OBSERVATIONS

(Between 700 and 1300, G. M. T.)

Isobars show corrected barometric readings in millibars.

Arrows fly with the wind.

Each full feather indicates two units of force, and a half feather indicates one unit of force on the Beaufort scale.

Weather symbols are as follows:

○ clear, ◑ partly cloudy, ● cloudy, : rain, ▲ hail, ✳ snow, ≡ fog.

Pairs of numbers indicate temperatures of air and surface of water in Fahrenheit degrees. Upper number, air; lower, water. Single numbers indicate air temperatures.